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PROCEEDINGS  
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AMERICAN SOCIETY  
OF  
CIVIL ENGINEERS

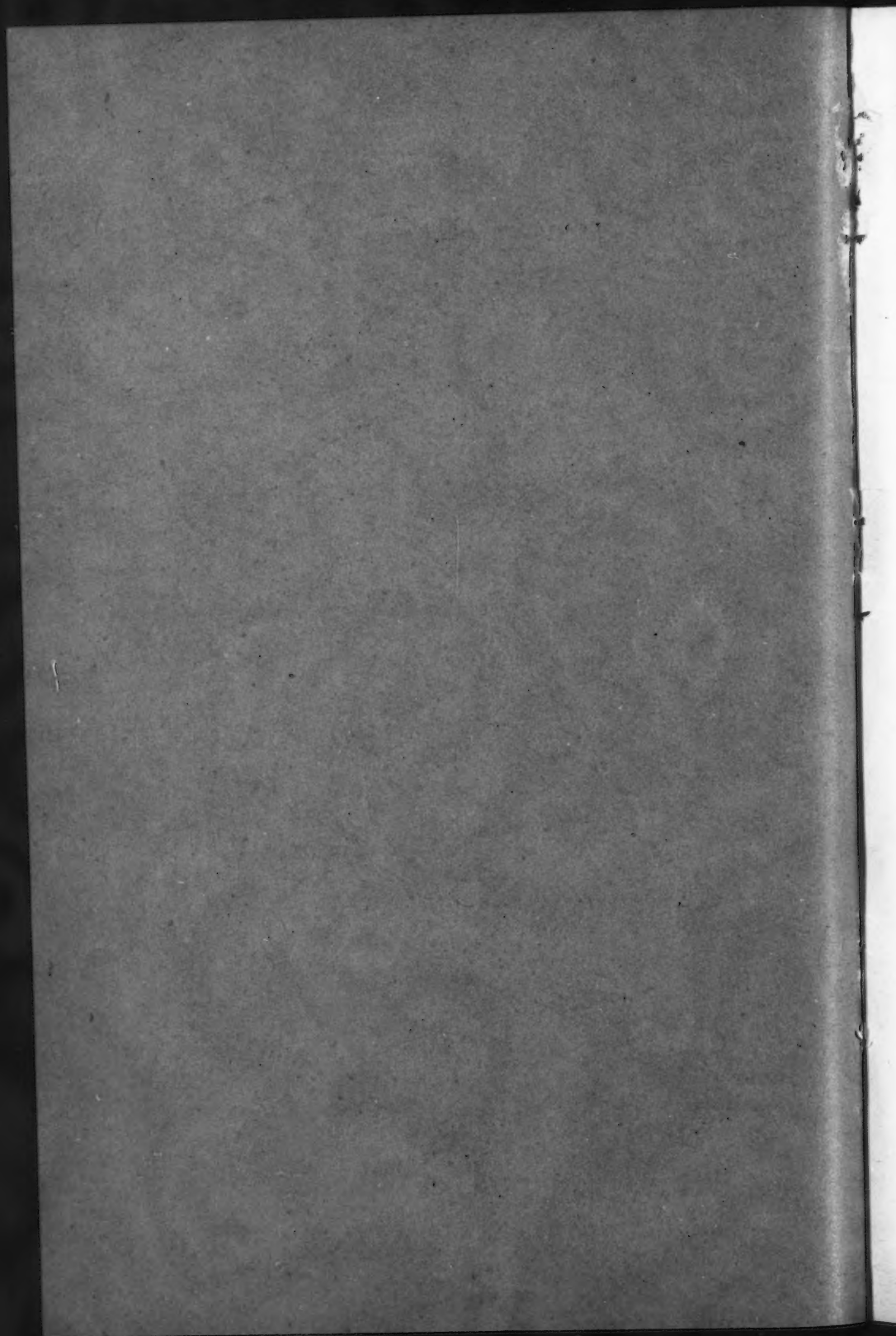
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# AMERICAN SOCIETY OF CIVIL ENGINEERS

INSTITUTED 1852

## PROCEEDINGS

This Society is not responsible for any statement made or opinion expressed in its publications.

### SOCIETY AFFAIRS

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### MINUTES OF MEETINGS OF THE SOCIETY

#### SIXTY-FOURTH ANNUAL MEETING\*

January 17th, 1917.—The meeting was called to order at 10 A. M., in the Auditorium of the United Engineering Society's Building, 29 West 39th Street; President Clemens Herschel in the chair; Chas. Warren Hunt, Secretary; and present, also, about 600 members.

Charles F. Rand, President of the United Engineering Society, addressed the meeting and welcomed the Society to the United Engineering Society's Building.

Messrs. B. F. Cresson, Jr., Clifford B. Moore, Robert W. Boyd, Noah Cummings, Richard H. Gillespie, Alexander Haring, and Henry

\* A full report of the Sixty-fourth Annual Meeting is printed on pages 77 to 123 of this number of *Proceedings*.

B. Machen were appointed Tellers to canvass the Ballot for Officers for the ensuing year.

The Annual Report of the Board of Direction, and the Annual Reports of the Secretary and of the Treasurer,\* for the year ending December 31st, 1916, were presented and accepted.

The Secretary read the report of the Committee appointed by the Board of Direction to recommend the award of prizes,† and announced that the medals and prizes for the year ending July, 1916, had been awarded by the Board of Direction in conformity with that report, as follows:

THE NORMAN MEDAL to Paper No. 1313, "The Possibilities in Bridge Construction by the Use of High-Alloy Steels," by J. A. L. Waddell, M. Am. Soc. C. E.

THE J. JAMES R. CROES MEDAL to Paper No. 1335, "History of Little Rock Junction Railway Bridge, of the St. Louis, Iron Mountain and Southern Railway Company, over the Arkansas River at Little Rock, Arkansas, 1883-1914," by C. E. Smith, M. Am. Soc. C. E.

THE THOMAS FITCH ROWLAND PRIZE to Paper No. 1334, "The Lock 12 Development of the Alabama Power Company, Coosa River, Alabama," by E. L. Sayers and A. C. Polk, Members, Am. Soc. C. E.

THE JAMES LAURIE PRIZE to Paper No. 1339, "Reconstruction of the Norfolk and Western Railway Company's Bridge Over the Ohio River at Kenova, West Virginia," by William G. Grove,‡ Esq., and Henry Taylor, Assoc. M. Am. Soc. C. E.

THE COLLINGWOOD PRIZE FOR JUNIORS to Paper No. 1341, "Cinder Concrete Floor Construction Between Steel Beams," by Harold Perrine and George E. Strehan,‡ Juniors, Am. Soc. C. E.

The Secretary presented the report of the Tellers appointed by the Board of Direction to canvass the final suggestions for members of the Nominating Committee, to represent certain Districts and the following were appointed to serve two years:

R. S. Buck.....	Representing District No. 1
D. B. La Du.....	" " " 3
John S. Conway.....	" " " 5
A. J. Himes.....	" " " 6
Arthur O. Ridgway.....	" " " 10
Louis C. Hill.....	" " " 11
W. C. Hammatt.....	" " " 13

Desmond FitzGerald, Past-President, Am. Soc. C. E., Chairman of the Special Committee on Engineering Education, reported progress, and Professor C. R. Mann addressed the meeting on that subject.

\* For these reports see pages 13 to 23 of *Proceedings* for January, 1917 (Vol. XLIII).

† See page 79.

‡ Now Assoc. M. Am. Soc. C. E.

George W. Tillson, M. Am. Soc. C. E., on behalf of W. W. Crosby, M. Am. Soc. C. E., Chairman of the Special Committee on Materials for Road Construction and Standards for their Test and Use, presented a Progress Report of that Committee.\*

L. D. Rights, M. Am. Soc. C. E., Secretary of the Special Committee on Steel Columns and Struts, presented a Progress Report of that Committee.†

J. R. Worcester, M. Am. Soc. C. E., Chairman of the Special Committee on Concrete and Reinforced Concrete, presented the Final Report of that Committee.‡

On motion, duly seconded, the report was received and the Committee discharged with thanks.

On motion, duly seconded, the question of the appointment of a new Special Committee on Concrete and Reinforced Concrete was referred to the Board of Direction.

N. P. Lewis, M. Am. Soc. C. E., Chairman of the Special Committee to Investigate the Conditions of Employment of, and Compensation of, Civil Engineers, presented the Final Report of that Committee.§

On motion, duly seconded, the report was accepted with thanks and the Committee discharged.

Frederic P. Stearns, Past-President, Am. Soc. C. E., Chairman of the Special Committee to Formulate Principles and Methods for the Valuation of Railroad Property and Other Public Utilities, presented the Report of that Committee.||

On motion, duly seconded, the report was accepted with thanks, and the question of the termination of the work and the discharge of the Committee, at such time as it shall have completed its work in summing up and replying to discussions arising from the presentation of its Final Report, was referred to the Board of Direction with power.

Robert A. Cummings, M. Am. Soc. C. E., Chairman of the Special Committee to Codify Present Practice on the Bearing Value of Soils for Foundations, reported progress.

A. N. Talbot, M. Am. Soc. C. E., Chairman of the Special Committee on Stresses in Railroad Track, reported progress.

On motion, duly seconded, the Special Committee on Floods and Flood Prevention, which presented its Final Report at the last Annual Meeting, and by the action of that meeting, was continued in order

\* Printed on pages 1611 to 1642 of Papers and Discussions in *Proceedings* for December, 1916.

† Printed on pages 1643 to 1656 of Papers and Discussions in *Proceedings* for December, 1916.

‡ Printed on pages 1657 to 1708 of Papers and Discussions in *Proceedings* for December, 1916.

§ Printed on pages 1603 to 1610 of Papers and Discussions in *Proceedings* for December, 1916.

|| Printed on pages 1709 to 1938 of Papers and Discussions in *Proceedings* for December, 1916.

that it might co-operate with the Special Committee on A National Water Law, was formally discharged.

On motion, duly seconded, the question of the appointment of a committee of five to investigate and report on the conditions and opportunities for American engineers in Russia and in South America, was referred to the Board of Direction.

H. R. Buck, M. Am. Soc. C. E., presented the following resolution:

*"Resolved: That the Board of Direction be requested to investigate the wisdom of establishing student branches of this Society, similar to the forty now successfully organized within the American Society of Mechanical Engineers, and the Board of Direction is requested to report to the Society and secure an expression of opinion and discussion from the membership in season for the matter to be presented, if desired, in the form of an amendment to the Constitution to be discussed at the next Annual Meeting."*

On motion, duly seconded, the resolution was carried.

The Secretary read a letter from Percival M. Churchill, Assoc. M. Am. Soc. C. E., offering the following:

*"Moved, That this Society appoint a committee of three to formulate a plan for the systematic marketing of Engineering Services. The Committee to be empowered and directed to request the co-operation of the other National Engineering Societies, especially the Consulting, Mining, Mechanical, and Electrical Societies. The Committee be empowered to employ a competent progressive Engineer, if deemed advisable, to work out the details of such a plan. This Committee to be appointed by the President within a month and to distribute its preliminary plans to the members of the Society before the regular summer meeting of the Society. The Committee be empowered to spend not over \$5 000 for this purpose from the funds of the Society."*

On motion, duly seconded, the matter was referred to the Board of Direction.

The Secretary made some announcements in reference to the excursions, and read a letter from George A. Harwood, M. Am. Soc. C. E., offering facilities to any one wishing to visit the Grand Central Terminal.

The Secretary also read letters from F. L. Hutchinson, Secretary of the American Institute of Electrical Engineers, Bradley Stoughton, Secretary of the American Institute of Mining Engineers, and Calvin W. Rice, Secretary of the American Society of Mechanical Engineers, offering the members of this Society all the privileges of the Members' Rooms of those Societies during Wednesday, January 17th, 1917.

On motion, duly seconded, the Secretary was instructed to express to the Secretaries of the various Societies the appreciation of this meeting for the courtesies extended.

The Secretary presented the report of the Tellers appointed to canvass the Ballot for Officers for the ensuing year.

The President announced the election of the following officers:

*President, to serve one year:*

GEORGE H. PEGRAM, New York City.

*Vice-Presidents, to serve two years:*

GEORGE W. KITTREDGE, New York City.

GEORGE S. WEBSTER, Philadelphia, Pa.

*Treasurer, to serve one year:*

GEORGE W. TILLSON, Brooklyn, N. Y.

*Directors, to serve three years:*

ALFRED D. FLINN, New York City.

LEWIS D. RIGHTS, New York City.

WILLIAM R. HILL, Albany, N. Y.

ARTHUR P. DAVIS, Washington, D. C.

W. L. DARLING, St. Paul, Minn.

R. H. THOMSON, Seattle, Wash.

Desmond FitzGerald and John A. Ockerson, Past-Presidents, Am. Soc. C. E., conducted Mr. Pegram to the chair.

Mr. Pegram addressed the meeting briefly.

Adjourned.

#### **SPECIAL MEETINGS FOR THE DISCUSSION OF THE PROGRESS REPORT OF THE SPECIAL COMMITTEE ON MATERIALS FOR ROAD CONSTRUCTION**

**January 19th, 1917.**—The meeting was called to order at 10.30 A. M.; George W. Tillson, M. Am. Soc. C. E., in the chair; A. H. Blanchard, M. Am. Soc. C. E., acting as Secretary; and present, also, 204 members and guests.

The chair announced that the meeting had been called for the purpose of discussing the Progress Report of the Special Committee on Materials for Road Construction and on Standards for Their Test and Use.

Written discussions by Messrs. Clifford Richardson, E. A. Stevens, Caleb Hyatt, Edward Whitwell, and William Goldsmith, were read by the Secretary. The report was then discussed orally by Messrs. W. B. Blair, E. W. Stern, W. H. Fulweiler, J. A. Beeler, W. M. Kinney, J. A. Johnston, C. D. Pollock, C. E. Mickey, Prévost Hubbard, George P. Hemstreet, Clifford Richardson, Samuel Whinery, H. S. Mattimore, A. H. Blanchard, T. M. Ripley, A. N. Johnson, P. P. Sharples, W. H. Connell, Herbert Spencer, H. E. Breed, and R. B. Gage.

Adjourned.

**January 19th, 1917.**—The meeting was called to order at 2.30 P. M.; George W. Tillson, M. Am. Soc. C. E., in the chair; A. H. Blanchard,



M. Am. Soc. C. E., acting as Secretary; and present, also 146 members and guests.

The discussion of the Progress Report of the Special Committee on Materials for Road Construction was resumed. Written discussions by Messrs. Clifford Richardson, William Goldsmith, E. A. Stevens, F. W. Cherrington, Edward Whitwell, W. C. Perkins, and Sanford E. Thompson were presented by the Secretary. The oral discussion was continued by Messrs. E. W. Stern, Clifford Richardson, H. L. Maier, C. E. Mickey, J. W. Howard, Samuel Whinery, A. N. Johnson, J. A. Beeler, W. M. Kinney, H. S. Mattimore, D. A. Abrams, R. A. Meeker, W. B. Blair, M. B. Greenough, Prévost Hubbard, C. D. Pollock, H. W. Durham, W. H. Connell, R. A. MacGregor, W. H. Broadhurst, W. H. Fulweiler, S. R. Church, and George W. Tillson.

Adjourned.

**February 7th, 1917.**—The meeting was called to order at 8.30 P. M.; Director L. D. Rights in the chair; Chas. Warren Hunt, Secretary; and present, also, 175 members and 24 guests.

The minutes of the meetings of December 20th, 1916, and January 3d, 1917, were approved as printed in *Proceedings* for January, 1917.

The Secretary gave a description of the work already accomplished by the Alfred Noble Memorial Committee, and exhibited lantern slide views of models of the memorial and of the site on which it is to be erected.

A paper by A. C. Dennis, M. Am. Soc. C. E., entitled "Construction Methods for Rogers Pass Tunnel", was presented by the Secretary, who also read a communication on the subject from Mr. E. Lauchli. The paper was then discussed orally by Messrs. R. A. Shailer, R. E. Dougherty, James F. Sanborn, Lazarus White, T. Kennard Thomson, F. L. Stuart, J. V. Davies, T. H. Wiggin, C. R. Hulsart, and S. A. Knowles.

The Secretary announced the election of the following candidates on January 15th, 1917:

AS MEMBERS

FRED BUCK, Rockledge, Fla.  
SYLVESTER QUAYLE CANNON, Salt Lake City, Utah  
MCGARVEY CLINE, Jacksonville, Fla.  
CHARLES DICKEY COLLINS, New York City  
HARRY WILLET RHODES, San Francisco, Cal.  
CHARLES BEECHER STANTON, Pittsburgh, Pa.  
GUY STERLING, Salt Lake City, Utah

AS ASSOCIATE MEMBERS

EDWARD DAHL ARDERY, New York City  
MERWIN ARMSTRONG, Duluth, Minn.

JOHN POLLOCK BONNER, Seth, W. Va.  
HARRY KERBAUGH CARPENTER, Clarksburg, W. Va.  
DELMAR SMITH CLINTON, San Francisco, Cal.  
RICHARD STEVENS DANFORTH, San Francisco, Cal.  
ALBERT LEE DONNELLY, New Haven, Conn.  
BEVERLY CHARLES DUNN, Washington, D. C.  
VICTOR NEWTON DUPUY, Juneau, Alaska  
ARTHUR H. EDGREN, Lincoln, Nebr.  
HAYWOOD RENICK FAISON, Wilmington, N. C.  
LELAND ISAAC GALE, Oakland, Cal.  
JOHN GARDNER GORDON, Jr., Los Angeles, Cal.  
JOHN HERBERT HARVELL, Seeley, Cal.  
THOMAS HEATLEY, New York City  
HORACE WRIGHT HOLLINGSWORTH, Tulsa, Okla.  
HAROLD DEVILLO HYND, New York City  
CHARLES COMFORT KINNE, Cleveland, Ohio  
THOMAS SILVESTER LEAVITT, Bolivar, Mo.  
DIXON BROWN PENICK, Austin, Tex.  
ALBERT AYER PETERS, San Luis Obispo, Cal.  
HARRY CHRISTIAN POSKE, El Paso, Tex.  
JOHN HARVEY ROBINSON, Mercer, Pa.  
GROVER CLEVELAND SESSLER, Philadelphia, Pa.  
FRED MATHEWS SLOANE, Chicago, Ill.  
SEISUKE TAKAHASHI, Kansas City, Mo.  
WALTER STEPHEN TANDROW, Los Angeles, Cal.  
CHARLES COFRAN HUBBARD THOMAS, Fresno, Cal.  
CARL HAWLEY WATSON, Great Neck, N. Y.  
GEORGE LINTON WATSON, Tampa, Fla.  
JOHN HENRY WELLER, Brighton, Trinidad  
BERNARD WICH, Brooklyn, N. Y.

## AS ASSOCIATE

PARKER RICHARDS WHITNEY, Ambridge, Pa.

## AS JUNIORS

LEON ARONESCU, New York City  
NATHAN THOMAS ASHKINS, Chicago, Ill.  
GEORGE GILBERT BOTHUM, Chicago, Ill.  
EARL HARRY COLLINS, Sault Ste. Marie, Mich.  
GEORGE DANIEL FRIED, Brooklyn, N. Y.  
GEORGE WASHINGTON GARDNER, Madison, N. J.  
JAMES HOLCOMBE GENUNG, Preston, Cuba  
DAVID FRANCIS GIBONEY, Tela, Honduras  
GEORGE WASHINGTON GRAFF, Kingston, N. Y.  
DANIEL COUGHLIN KANE, Brooklyn, N. Y.

HAROLD CARPENDALE MASLEN, New York City  
SIMON MEDINE, New York City  
DAVID NELSON MILHAN, Atlanta, Ga.  
ARMANDO DE ARRUDA PEREIRA, São Paulo, Brazil  
JOSEPH PICKUS, Sioux City, Iowa  
REIS JOSEPH RYLAND, San José, Cal.  
WILLIAM OSBORNE SELL, Cincinnati, Ohio  
HAROLD CLINTON SEWARD, Brooklyn, N. Y.  
JAMES LEO SMITH, New York City  
UEL STEPHENS, Arkansas City, Ark.  
MAURICE PELHAM VAN BUREN, New Brighton, N. Y.  
ANDREW JACKSON VAN SISE, Audubon, Iowa  
WATSON FRANK WALKER, Detroit, Mich.

The Secretary announced the transfer of the following candidates on January 15th and 16th, 1917:

FROM ASSOCIATE MEMBER TO MEMBER

ALBERT CORNELIUS AREND, Omaha, Nebr.  
CHARLES DWIGHT AVERY, Cheyenne, Wyo.  
JOHN EDWIN BANKS, Ambridge, Pa.  
JOSEPH SHIRLEY BRIGHT, San Bernardino, Cal.  
JOHN OTIS BURRAGE, San Francisco, Cal.  
GEORGE GALE DIXON, Akron, Ohio  
BURTON PERCIVAL FLEMING, Iowa City, Iowa  
HERMAN KEENE HIGGINS, Jackson, Mich.  
JULIUS KAHN, Youngstown, Ohio  
GEORGE LATIMORE LUCAS, New York City  
JUSTIN WYMAN LUDLOW, San Pedro, Cal.  
EDWARD NEWTON NOYES, Dallas, Tex.  
HOWARD EASTWOOD PHELPS, Boulder, Colo.  
HENRY BLANCHARD PRATT, Waltham, Mass.  
GEORGE AUSTIN QUINLAN, Chicago, Ill.

FROM JUNIOR TO ASSOCIATE MEMBER

ERNEST SAMUEL ALDERMAN, West Palm Beach, Fla.  
HARRY ARTHUR ARMSTRONG, Sacramento, Cal.  
WILLIAM ANDREWS BARTLETT, Devon, Conn.  
CHARLES FOWLER BORNEFELD, Minneapolis, Minn.  
WALTER WOODBRIDGE CLIFFORD, Hyde Park, Mass.  
ROBERT JOSEPH COLGAN, Dravosburg, Pa.  
ROBERT EDWARD DAKIN, New Haven, Conn.  
VIRGIL ALLEN EBERLY, Washington, D. C.  
BENJAMIN JAY GARNETT, Spokane, Wash.  
ORIN WILSON HARRAH, Nashua, Mont.

GEORGE CLEVELAND HAUN, Chicago, Ill.  
WILLIAM WESTERFIELD HAVENS, New York City  
EDWIN AMBLER INGHAM, Grace, Idaho  
CHARLES SCOTT PATTERSON, Wichita Falls, Tex.  
CHARLES FRANKLIN REANEY, Waterloo, Iowa  
ARTHUR PORTER SMYTH, Polson, Mont.  
AUSTIN RUSSELL WILLARD SPERRY, Folsom, Cal.  
GEORGE SPARKMAN WARD, Spartanburg, S. C.

The Secretary announced the following deaths:

ANDREW CHASE CUNNINGHAM, of Washington, D. C., elected Associate Member, September 2d, 1891; Member, October 3d, 1894; died January 13th, 1917.

RICHARD EVANS, of Jamaica, N. Y., elected Member, June 7th, 1893; died December 30th, 1916.

THOMAS CHALMERS MCCOLLOM, of Philadelphia, Pa., elected Member, May 3d, 1882; died January 4th, 1917.

SIR HIRAM STEVENS MAXIM, of London, England, elected Member, October 7th, 1885; died November 24th, 1916.

HENRY GORDON STOTT, of New York City, elected Member, July 1st, 1908; died January 15th, 1917.

GEORGE ALEXANDER HUTCHINGS MOULD, of Brooklyn, N. Y., elected Associate Member, December 7th, 1904; died January 21st, 1917.

WILLIAM STUART SMITH, of Rochester, N. Y., elected Associate Member, January 8th, 1902; died November 5th, 1916.

SAMUEL FORSYTHE THOMSON, of Brooklyn, N. Y., elected Associate Member, January 3d, 1906; died January 30th, 1917.

Adjourned.

#### OF THE BOARD OF DIRECTION

(Abstract)

**January 15th, 1917.**—The Board met at 10.10 A. M.; President Herschel in the chair; Chas. Warren Hunt, Secretary; and present, also, Messrs. Bontecou, Bush, Coleman, Craven, Davies, Duryea, Endicott, Fuller, Greiner, Harwood, Humphreys, Jonah, McDonald, Marx, Montfort, Ockerson, Randolph, Swain, and Tuttle.

Frederick C. Noble was unanimously elected a Director to fill the unexpired term of the late Virgil G. Bogue, whose death occurred on October 14th, 1916. Mr. Noble was notified of his election and took his seat in the Board about an hour later.

Mr. Davies, Chairman of the Committee on Special Committees, presented a Report.

On motion, duly seconded, the Report of the Committee was received and all of its recommendations adopted, and the Secretary was

instructed to publish this Report in *Proceedings*,\* together with the action of the Board thereon, for the information of the membership.

Chas. Warren Hunt, whose term as one of the representatives of this Society on the United Engineering Society Board expires this month, was reappointed to serve for three years, and the terms of the other two representatives of this Society were fixed as follows: The term of Clemens Herschel to terminate in January, 1918, and the term of J. Vipond Davies to terminate in January, 1919.

The Annual Report of the Board of Direction was adopted for presentation to the Annual Meeting.

The Secretary reported that the total amount of cash paid to date to the United Engineering Society on account of the enlargement of the Thirty-ninth Street Building is \$67 000. He further reported, as a member of the Building Committee of the U. E. S., that the columns for the support of the additional stories had been finished at a cost of approximately \$60 000, and that a contract for the remainder of the work had been let.

A letter from Chas. F. Rand, President, U. E. S., was presented, addressed to the four Founder Societies, which stated that, due entirely to increased cost of materials of construction, the estimate originally made for the cost of the enlargement would be exceeded by an estimated amount of \$50 000, making a total estimated cost of \$300 000 instead of \$250 000 as originally estimated, and suggesting that the increased cost of the addition should be assumed equally by the four Founder Societies.

On motion, duly seconded, the Secretary was instructed to inform Mr. Rand that this Society agrees to be responsible for its one-quarter of the deficit.

Matters relating to the proposed sale of the real property of the Society were considered.

The appointment of Messrs. Clemens Herschel, William H. Bixby, and William H. Yates, to represent the Society at any conference in Washington on the subject of Water Power Development, was reported.

The Secretary reported the appointment by President Herschel of Messrs. William H. Burr, John H. Gregory, and Henry N. Lathey to represent this Society at a conference with similar committees from the Mining, Mechanical, Electric, and Testing Materials Societies, on the subject of American Engineering Standards.

The Report of the Committee to Recommend the Award of Prizes for the year ending July, 1916, was presented.†

On motion, duly seconded, the recommendations of the Report were adopted as the action of the Board.

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\* See page 124.

† See page 79.



The Constitution of the newly-formed Nebraska Association of Members of the Society was presented and approved by the Board.

Letters from two Local Associations of Members, asking for rulings as to the proper relations of Local Associations of Members to the Society, to similar Associations of other Societies, and to local Engineering Associations and Clubs, as well as the question of how far such Local Associations may properly go in local matters of a more or less public nature, were considered. The President was authorized to appoint a Committee of three to report back to the Board on the subject.

The President subsequently appointed Messrs. Daniel Bontecou, Hunter McDonald, and Frank G. Jonah.

A Committee was appointed to represent this Society in a conference with similar committees of other National Societies to consider matters of joint interest to the Profession of Engineering as distinct from purely technical activities.

Action was taken in regard to members in arrears for dues.

The resignations of 14 Members, 28 Associate Members, 9 Juniors, and 1 Associate were accepted.

Ballots for membership were canvassed, resulting in the election of 7 Members, 31 Associate Members, 1 Associate, and 23 Juniors, and the transfer of 18 Juniors to the grade of Associate Member.

Fifteen Associate Members were transferred to the grade of Member.

Adjourned.

**January 16th, 1917.**—The Board met at 3.50 P. M., immediately upon the adjournment of the Membership Committee; President Herschel in the chair; Chas. Warren Hunt, Secretary; and present, also, Messrs. Bontecou, Coleman, Cooley, Crocker, Davies, Duryea, Endicott, Greiner, Humphreys, Jonah, McDonald, Marx, Montfort, Noble, Ockerson, Randolph, and Tuttle.

A report from the Membership Committee was received and acted upon.

It was decided that on the Report of Disbursements, which accompanied the Report of the Board of Direction, the item "Salaries of Officers" should be explained by a foot-note giving the yearly salaries of the Secretary, of the Treasurer, and of the Assistant Secretary.\*

Adjourned 4.25 P. M.

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\*The Report of Disbursements having already gone to press for the January Number of *Proceedings*, this information could not be added to it, and it is here given.

The salary of the Secretary is.....	\$12 000
" " " " Assistant Secretary is.....	3 000
" " " " Treasurer is.....	100

**January 17th, 1917.—1.40 P. M.**—The Board met, as required by the Constitution (Art. VI, Sec. 7), at 29 West 39th Street, New York City; President Pegram in the chair; Chas. Warren Hunt, Secretary; and present, also, Messrs. Coleman, Craven, Crocker, Darling, Davies, Davis, Duryea, Flinn, Harwood, Hawley, Hill, Jonah, Kittredge, Khuen, McDonald, Marx, Noble, Ockerson, Rights, Swain, Tillson, and Webster.

The President announced that the first business was the election of a Secretary.

Mr. Hunt retired.

Chas. Warren Hunt was nominated for Secretary, and nominations were closed.

Mr. Hunt was unanimously elected.

It was moved and seconded that the salary of the Secretary be fixed at \$7 500.

An amendment to substitute \$12 000 was made and seconded.

On motion, duly seconded, the amendment was carried, and the original motion as amended was adopted by the unanimous vote of the members present.

Mr. Hunt was recalled.

The following Standing Committees of the Board were appointed: Finance Committee: George W. Kittredge, Chairman, Alfred Craven, Alexander C. Humphreys, Otis F. Clapp, and Frank G. Jonah; Publication Committee: George A. Harwood, Chairman, Lewis D. Rights, Frederick C. Noble, J. E. Greiner, and John F. Coleman; Library Committee:\* George A. Harwood, A. D. Flinn, Lewis D. Rights, J. V. Davies, and Chas. Warren Hunt; Committee on Special Committees: J. V. Davies, Chairman, George W. Tillson, and W. L. Darling.

**Adjourned.**

\* Representatives of the Society on the Library Board of the United Engineering Society.

**REPORT IN FULL OF THE SIXTY-FOURTH ANNUAL MEETING,  
JANUARY 17TH AND 18TH, 1917**

**Wednesday, January 17th, 1917 (10 A. M.).**—The Sixty-Fourth Annual Meeting was called to order in the Auditorium of the United Engineering Society's Building, 25 West 39th street, New York City; President Clemens Herschel in the chair; Charles Warren Hunt, Secretary; and present, also, about 600 members.

**THE PRESIDENT.**—It has been suggested that it would be a gracious thing if the Past-Presidents of the Society would kindly step forward and take seats on the platform; I hope they will do so.

Gentlemen of the American Society of Civil Engineers, it is hardly necessary for me to state the pleasure it gives me to greet the Society and give you a welcome in this hall. We are here, and we are also on Fifty-Seventh Street as yet, and our being here is largely due to the invitation of the United Engineering Society, which is the holding company for this real estate.

If Mr. Rand, the President of that Society, is here, I would like to have him come forward and say a few words to you on this occasion.

**CHARLES F. RAND, ESQ., PRESIDENT, UNITED ENGINEERING SOCIETY.**—As one who has looked forward very earnestly to this day, and who has made a modest effort in favor of the new arrangements, it is a peculiar satisfaction to be the representative of the Trustees of the United Engineering Society, and to welcome you, on the occasion of your first meeting in this building in which you now own a quarter interest.

As this is your Annual Meeting, I cannot take your time for extended remarks, yet it seems proper that I should call attention to a few facts respecting the United Engineering Society with which you are now identified.

The United Engineering Society exists for the purpose of holding the legal title to certain of the property of the Society of Civil, Mining, Mechanical, and Electrical Engineers—and to act for them in certain matters.

The value of its property, including real estate, the Library, and the Reserve and Endowment funds exceeds two million dollars, all free and clear.

The total membership of the four Founder societies is 29 000, and the membership of associate societies is 23 000, making a grand total of 52 000 engineers, who now have headquarters in this building.

As is well known, the United Engineering Society stands, not over, but under the Founder societies. It is organized to perform for the Founders certain specific acts which are governed by contracts. There is no merger of societies, each retains its individuality. The United Engineering Society enables the Founders to co-operate conveniently.

The Engineering Foundation is a fund of \$200 000, belonging to the United Engineering Society, established for engineering research, with a gift from Ambrose Swasey, and which fund it is hoped will soon be increased many times.

The great Library now includes that of the Civil Engineers, and contains approximately 75 000 bound volumes and 50 000 unbound. It is believed to be the largest engineering collection in the world. Plans have been made for the development of the Library, which contemplate the expenditure of \$50 000 annually. At present the societies can only afford to spend \$20 000 per year. The Library has an endowment of \$100 000. This we hope may soon amount to a million, as the Library needs the income from that sum.

The United Engineering Society has been established thirteen years. It was originally developed through the efforts of the Society of Mining, Mechanical, and Electrical Engineers. To this organization the American Society of Civil Engineers has joined its strength and prestige, and takes a leading part.

Your new home is being rapidly prepared for you, and will be ready during the current year. The six months of intimate association and cordial co-operation we have already had with the officers of your Society indicates that a move has been taken of great value and importance to engineers.

Gentlemen: Welcome to your own home.

THE PRESIDENT.—The first business is to announce that Messrs. B. F. Cresson, Jr., Clifford B. Moore, Robert W. Boyd, Noah Cummings, Richard H. Gillespie, Alexander Haring and H. B. Machen have been appointed Tellers to canvass the Ballots for Officers, and their report will be ready for presentation before the close of the meeting.

The next business in order is the report of the Board of Direction, Mr. Secretary.

The Secretary presented the Report of the Board of Direction\* and the Report of the Secretary.†

THE SECRETARY.—The Treasurer, Mr. Lincoln Bush, has asked me to present his report for him, as he could not get here this morning.

The Secretary read the Report of the Treasurer.‡

THE PRESIDENT.—What is your pleasure in regard to these reports?

(Moved and seconded that the reports be accepted.)

THE PRESIDENT.—It is moved and seconded that the reports be accepted and placed on file. All in favor say "aye"; contrary minded, "no."

(Motion carried.)

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\* See *Proceedings*, Am. Soc. C. E., Vol. XLIII, p. 13 (January, 1917).

† See *Proceedings*, Am. Soc. C. E., Vol. XLIII, p. 20 (January, 1917).

‡ See *Proceedings*, Am. Soc. C. E., Vol. XLIII, p. 23 (January, 1917)

THE PRESIDENT.—The report of the Committee to Recommend the Award of Prizes for 1916, and the action of the Board of Direction in relation thereto.

THE SECRETARY.—I have to report that the Board of Direction has received the recommendations of this Committee and has made the awards in accordance with that report. The report is as follows:

“TO THE SECRETARY

OF THE AMERICAN SOCIETY OF CIVIL ENGINEERS.

“SIR: Your committee, having very carefully read and marked the papers in Volumes LXXVIII and LXXIX, recommends that the awards be made as follows:

“The Norman Medal to Mr. J. A. L. Waddell: Paper 1313, Title—‘The Possibilities in Bridge Construction by the Use of High-Alloy Steels.’

“The J. James R. Croes Medal to Mr. C. E. Smith: Paper 1335, Title—‘History of Little Rock Junction Railway Bridge of the St. Louis, Iron Mountain and Southern Railway Co.’, etc.

“The Thomas Fitch Rowland Prize to Messrs. E. L. Sayers and A. C. Polk: Paper 1334, Title—‘The Lock 12 Development of the Alabama Power Company, Coosa River, Alabama.’

“The James Laurie Prize to Messrs. William G. Grove and Henry Taylor: Paper 1339, Title—‘Reconstruction of the Norfolk and Western Railway Company’s Bridge Over the Ohio River’, etc.

“The Collingwood Prize for Juniors to Messrs. Harold Perrine and George E. Strehan: Paper 1341, Title—‘Cinder Concrete Floor Construction Between Steel Beams.’

“G. J. FIEBEGER, Member.

WM. CAIN, Member.

W. K. BARNARD, Member.”

THE PRESIDENT.—The next business is the appointment of members to serve on the Nominating Committee, and the report of the Board of the count of the final suggestions received from Districts Nos. 1, 3, 5, 6, 10, 11, and 13.

The Secretary presented the report of the Tellers, as follows:

“TO THE BOARD OF DIRECTION,  
AMERICAN SOCIETY OF CIVIL ENGINEERS:

“The undersigned Tellers appointed to canvass the Final Suggestions for Members of the Nominating Committee to represent Districts Nos. 1, 3, 5, 6, 10, 11, and 13, beg leave to report as follows:

“District No. 1.—Total number of Suggestions received, 324:

“R. S. Buck.....	191	J. S. Langthorn.....	21
D. L. Turner.....	105	Scattering .....	7

“District No. 3.—Total number of Suggestions received, 213:

“D. B. La Du.....	131	E. A. Fisher.....	15
John F. Skinner.....	34	T. R. Lawson.....	9
O. H. Landreth.....	18	Scattering .....	6



*"District No. 5.—Total number of Suggestions received, 138:*

"John S. Conway.....	62	Joseph E. Crawford.....	5
W. L. Seddon.....	41	P. H. Norcross.....	3
W. M. Black.....	12	Scattering .....	8
A. P. Davis.....	7		

*"District No. 6.—Total number of Suggestions received, 112:*

"A. J. Himes.....	64	Morris Knowles.....	19
J. A. Atwood.....	23	Walter M. Smith.....	6

*"District No. 10.—Total number of Suggestions received, 92:*

"Arthur O. Ridgway.....	35	M. S. Ketchum.....	20
Frank E. Weymouth....	34	Scattering .....	3

*"District No. 11.—Total number of Suggestions received, 101:*

"Louis C. Hill.....	46	J. B. Lippincott.....	19
C. H. Chamberlin.....	32	Scattering .....	4

*"District No. 13.—Total number of Suggestions received, 102:*

"W. C. Hammatt.....	38	B. A. Etcheverry.....	26
C. E. Grunsky.....	35	Scattering .....	3

"ARTHUR S. TUTTLE,  
GEORGE W. FULLER,  
LINCOLN BUSH,  
"Tellers."

The Districts were taken up separately, and, by vote of the meeting, the following members of the Nominating Committee were appointed to serve for two years:

R. S. BUCK.....	Representing District No. 1
D. B. LA DU.....	" " " 3
JOHN S. CONWAY.....	" " " 5
A. J. HIMES.....	" " " 6
ARTHUR O. RIDGWAY.....	" " " 10
LOUIS C. HILL.....	" " " 11
W. C. HAMMATT.....	" " " 13

THE PRESIDENT.—The next business in the order of proceedings is the Report of the Special Committee on Engineering Education, Desmond FitzGerald, Past-President, Chairman.

DESMOND FITZGERALD, PAST-PRESIDENT, AM. SOC. C. E.—Mr. President and Gentlemen. The Committee on Engineering Education desires to make a brief progress report. I wish to extend the thanks of the Committee to the Society, however, for the forbearance which they have shown to this Committee. It is now about seven or eight years since we were appointed, and as yet no report. It is no wonder to me that some members of the Society have kicked. It is only a

wonder that all the members have not kicked; but after all, I think it is what you might expect of a Society made up of the material of which this is composed.

We studied ourselves for a number of years, and found we were making but very little progress. Now, as you know, the country is full of cranks on this subject. Almost every man believes that he knows, that he holds in his hand, the solution of this difficult problem of Engineering Education, and that is one reason why I have stuck to this Committee through all these years, because I believed that we should take a conservative view of it, and that it would take time to work out a proper solution of this important question.

Now, after a number of years—after we were working alone—we joined the large Committee of nineteen members who were working on the same subject. This Committee, the Committee on Engineering Education for the allied Societies, as you know, has been doing excellent work.

This Committee is composed of members from different branches of our own profession, mechanical engineers, chemical engineers, mining engineers, and the other different branches, as well as some of the outside societies, such as the Society for General Education and the Carnegie Foundation.

Now, to make a long story short, we have succeeded in getting the Carnegie Foundation to take this matter seriously in hand, and they have, very kindly, not only spent a very large sum of money for us, under our direction, but they have devoted their thought, which is better still, and their interest. Dr. C. R. Mann was appointed to make that investigation.

Personally, I have always believed that if engineering education was to be improved, it would be in the fundamentals, in the principles, lying at the foundation of the structure.

We worked a number of years along the lines of the curricula, and we got into a mess of trouble, and finally it dawned on me, as it did I think on other members of the Committee, that the fundamental principles of engineering education, if they were to be improved, would result in real benefit to the Profession.

Dr. Mann has kindly come here this morning, and he will tell you briefly that the time is now almost at hand when you will receive a report on this important subject, and I am going to ask Dr. Mann to say a few words.

I want to say first that I believe you believe with me that engineering is now on the threshold of a most important change. The union of all the different branches of the Profession is going to give it a strength and an influence which will be almost incalculable, not only in the Profession, but also in the education of young engineers, and in the affairs of the nation. It is particularly important, I believe,

therefore, that we cannot be too careful, to see that we start the young engineer in the right course. It was a great delight to me, when, very early in this investigation, Dr. Mann "hit the trail," if I may use that expression, on these very fundamental principles; and that the questions of the personality of the engineer, and particularly of his character, are two of the principal matters which we have to consider.

Now, will you have Dr. Mann say a few words?

C. R. MANN, Esq.—Mr. President and Gentlemen.—I feel rather ashamed to appear before this organization a second time without a completed report, but the fault is not altogether mine, for just as I sat down to write my report a year ago, shortly after your meeting, you started a revolution among engineers, concerning the status of the engineer in the national, political and social life. It has required almost a year of study of changing relations to discover their trend and meaning. It will not do to determine the general principles of engineering education until we know what the country is going to demand of its engineers, and hence the delay in the work.

Since the last meeting, all of you have received the second letter that we sent asking you to express your opinion as to the relative importance of character, judgment, efficiency, understanding of men, and knowledge of the science and technique of engineering practice. We sent 29 000 letters to the members of the four national societies, and have received 7 070 replies. The statistical analysis of these replies shows that the order in which the qualities were arranged on the original card—the order that was determined by the first set of letters—is upheld by a very large majority.

The replies were also sorted carefully on the basis of years of experience, in order to determine whether the younger engineers take a different point of view than the older engineers, but there is absolutely no difference. For example, 1 000 engineers with less than 10 years' experience, 2 000 with from 10 to 20 years' experience, and 1 000 with from 20 to 30 years' experience vote that character is more important than knowledge by majorities of 91.8, 91.9, and 91.0%, respectively. Hence the conclusion that this statement of the important elements for engineering education corresponds really to some fundamental idea in the engineer's mind as to the qualities necessary to success in the Profession.

If this is so, what is its meaning for the schools? Several suggestions have been made in answer to this question, and a great deal of misunderstanding has arisen. For example, a correspondent of *Engineering News*, last year suggested that this was a new kind of score card for rating engineers, analogous to the score cards that they use in cattle judging exhibitions. Of course, nothing of the sort was intended, as such a use would not help the schools. To get the inter-

pretation, you must correlate the statement on that card with modern educational theory.

It is a generally accepted fact in education that a student learns best and most efficiently when he works with enthusiasm at his studies; when he wants to do the work at the time that he is doing it. When this is the case the student is said to be "motivated." Similarly, it is generally recognized in life—in engineering practice—that a man develops best—develops character, judgment, efficiency and those other desired qualities best—when he works with enthusiasm and loves his work.

Therefore, if the school work is arranged so that the student is "motivated" while he is doing it—if he loves his school work, is enthusiastic over it—he develops judgment, character, efficiency, in the same way that he does in life, when he works with enthusiasm and loves his job. Hence, the first connection between the demands of the engineering profession and the school work is through motivation. If we can motivate the school work, we will contribute best to the development of those much desired human characteristics.

There is another connection between the school work and the professional demand. To discover this, consider what is the most important element of resourcefulness or of common sense.

If a man's machine breaks down when he is out in the wilds and he can relate the available resources to the break in the machine in such a way as to make it run, we say he is resourceful. He is able to see new relations among familiar things.

In like manner, a man is efficient if he is able to have things in their proper places at the proper time. This, again, is a case of perceiving right relationships among things. In other words, those qualities that are demanded by the engineering profession depend on a man's ability to see right relationships and to place things in the most expedient relationships with one another. In the school world this is called "interrelation." So that the schools will be contributing most effectively to developing in students those qualities which the engineers want, if they develop this power of interrelation, of seeing things in the right relations. This, of course, is accomplished by interrelating the school work properly.

In these two words—"motivation" and "interrelation"—you have the key to the educational interpretation of that card. How are they used in testing schools? Take, for example, the word "interrelation." How are the schools organized to foster the growth of this power among students?

The schools are organized on the administrative side, in separate departments. If an engineering school is a part of a large university, the departments of mathematics, of chemistry, of physics, of English,

and of German, are organized under the arts college faculty, while the engineering departments are organized as a separate faculty.

One of the most serious complaints of the engineer is that the professors of mathematics do not teach the kind of mathematics that the engineering students can use; but the mathematics department is organized with the arts faculty, while the engineering departments are organized as a separate faculty, and there is little intercommunication between them. The result is that there is very little interrelation between the department teaching mathematics and the department teaching engineering; and if there is no interrelation in the organization, there is likely to be little interrelation in the students' minds.

Therefore, when the school is organized so that the various departments are separate, gas-tight departments, with little intercommunication between them, you cannot expect the students to discover interrelations among the various mathematical subjects. This idea of interrelation not only applies to the administration of the school as a whole, it applies equally well to the building up of a curriculum; in this way, two words, "motivation" and "interrelation," can be used to discover the strong points and the weaknesses of a school.

This idea is now being embodied in the report. We hope to have the report completed within a few months, and it will be available for distribution to any of you who are sufficiently interested to send for it. We have put on the mailing list the names of all those who have replied to any of our communications, and of those who have expressed a desire to be kept informed of progress.

THE PRESIDENT.—The next number is the Progress Report of the Special Committee on Materials for Road Construction and on Standards for Their Test and Use, W. W. Crosby, Chairman.

The report is printed in the December, 1916, *Proceedings*. Is Mr. Crosby here? Mr. Tillson, will you take the platform?

GEORGE W. TILLSON, M. Am. Soc. C. E.—Mr. Chairman, the Chairman of this Committee being in Texas, doing military duty, it has devolved upon me to present this report, and in doing so, I want to say that the Committee has endeavored to work during the past year on the lines as designated by the Meeting a year ago. The Committee had hoped to present a complete report this year, but on account of the enormous amount of detail, and the other duties of the Committee, as well as the absence of the Chairman, it has not been able to do this.

We do feel, however, that if the Committee is continued, it will be able to produce a final report in another year; but in this connection I want to say that a report upon such a subject as this, a subject that covers so many individual items and things, where the practice is continually changing, can never be a final report, except at the time that it is made. A year from the time it is made the chances are that the practices will have changed to such an extent that the report would



not be up to date; and, in order to keep the Society informed continually, on the subject that is outlined in this report, it would be necessary to have a standing Committee, which should make every year a report showing what changes have been made in practices during the preceding year, and what amendments should be made in the principles adopted by the Society.

There is one thing more that I would like to mention: In the latter part of the report, where we refer to wood block pavements, I would say that the principles outlined there, as far as the manufacture or the treatment of the blocks is concerned, were adopted by a meeting held in Brooklyn on September 12th, 1916, by representatives of the Committees of the American Society for Testing Materials, the American Society of Municipal Improvements, the American Wood Preservers' Association, the American Railway Engineering Association, the Southern Pine Association, and this Society, the idea being, if possible to have all the different Committees and the various societies agree upon one set of principles, so that each of the societies would be working along the same lines.

This was accomplished, and these principles, as given here, were adopted by the American Society of Municipal Improvements, in Newark, in October, without any material change, and they have been presented, or will be presented, next week at the meeting of the American Wood Preservers' Association, to be held in this City. But I want to say that, since those principles were adopted and this report was made and reported to the Society, and I think also put in type, a patent has been issued that could possibly cover some of the principles as indicated in the question of treatment. The patentee has told the Committee of the American Wood Preservers' Association that he is willing to go into some agreement so that the patents will not interfere with the changed use.

Whether that agreement can be worked out or not cannot be known until the meeting of the Wood Preservers' Association next week. I have been informed, however, by good authority, that if in this report the clause that refers to the final steaming of the blocks, after they have been treated, is left out, there will be no possibility of any infringement of the patent. This matter will be considered in full by the Committee before a final report is made, if the Committee is continued.

I wish, however, to make it clear at this meeting just what the situation was, and that when the principles were adopted by the Committee nothing was known about this patent. I do not think there is any necessity for saying anything about the report, except possibly to state that there will be a meeting in the Society House on 57th Street on Friday of this week at 10 A. M., to discuss in detail the principles given therein.

THE PRESIDENT.—The next business will be the Progress Report of the Special Committee on a National Water Law, F. H. Newell, Chairman. This report is printed in the December, 1916, *Proceedings*. Is Mr. Newell present? If not, inasmuch as the report is printed, perhaps we had better proceed to the next number, which is the Progress Report of the Special Committee on Steel Columns and Struts, George H. Pegram, Chairman. The report is printed in the December, 1916, *Proceedings*. I call upon Mr. Pegram.

GEORGE H. PEGRAM, M. AM. SOC. C. E.—I shall ask Mr. Rights, our hard-working Secretary, to present the report.

THE PRESIDENT.—Mr. Rights, will you please take the platform?

L. D. RIGHTS, M. AM. SOC. C. E.—Mr. Chairman and Gentlemen, I do not know that there is anything special to state with respect to this report, other than that already given in the December *Proceedings*. It is a somewhat difficult thing to know just what to put into a progress report. If you put in too much, you may have to take something back after a while; and if you do not put in enough, why, the Committee on Special Committees may get after you for not doing any work.

We have tried, as far as possible, to give the work which has been done by the Bureau of Standards at Washington as fully and completely as possible; and you have these reports of tests, as shown in the December *Proceedings* and as distributed in these pamphlets.

There is a great deal remaining to be done, but not so much in these tests—we have practically completed the original series of tests. Like a good many other investigations of that sort, we do not get just the results we expected. We found something markedly different from what we expected, and we now have to try to interpret those results. The Committee and the Bureau of Standards are hard at work on those matters, and we hope to be able to give you something much more complete next year.

THE PRESIDENT.—The next business is the Final Report of the Special Committee on Concrete and Reinforced Concrete, Joseph R. Worcester, Chairman. This Report is printed in the December, 1916, *Proceedings*.

J. R. WORCESTER, M. AM. SOC. C. E.—The Special Committee on Concrete and Reinforced Concrete has presented to the Society its final technical report, but the Committee feels that, in addition to the submission of this report, it should be allowed, as a matter of personal privilege, to present to the Society a few words bearing upon the general question raised at the Annual Convention of the Society at Pittsburgh on June 27th, 1916, as to its sins of omission and commission.

At that time a member of the Board of Direction of the Society took occasion to criticise the Special Committee on Concrete and Rein-

forced Concrete and to cast upon the Committee discourteous reflections, which were wholly unwarranted by the facts. The Committee had no warning that an attack of this character was likely to be made, and it happened that only one member of the Committee was present. He was not in a position to offer definite statements in answer to the accusations made, and the Committee desires now to refer briefly to the matter for the purpose of correcting the impression which may have been left by the discussion on that occasion.

It is unnecessary for the Committee to defend the technical work which it has done. The two reports which the Committee has presented have had a very wide circulation, not only through the publications of this Society, but through the American Society for Testing Materials and the American Railway Engineering Association. The recommendations of the reports have been embodied very largely in building laws in many cities of the country, and have been used as a guide by building departments not having complete laws. The reports have had a far-reaching effect on the practice of the art by engineers, architects, and contractors, and have, to a considerable degree, accomplished the results for which the Committee was appointed.

The work of the Committee since 1912 has been briefly described in the reports presented to the Annual Meetings. What has been done during the past fifteen months has been reported to the Board of Direction faithfully and regularly in accordance with the instructions of the Board, and the minutes of the eight meetings and nineteen sessions of the Committee have been printed in the *Proceedings*. No effort of the Board of Direction to obtain information from the Committee as to its work has been ignored by the Committee, and no questions have been asked to which full answers have not been rendered. The Committee has observed carefully all the rules laid down by the Board for the conduct of Special Committees, and has complied with them in every particular.

The Special Committee had taken pains to inform the Board through its Committee that it intended to complete its work by July 1st. No intimation was received by the Special Committee from the Board that the Board expected to receive this final report in time for presentation at the meeting of June 27th, until the programme of the Annual Convention was sent to all members. This was so late that it would have been absolutely impossible to get the report in shape by that date. It had been arranged that the final meeting of the Committee would be held on June 30th, and even this date was possible only through the sacrifice of time and convenience by members of the Committee, in order to hasten matters. The difficulties of making up a report on such a subject as this, where practice is being made, and knowledge concerning structural action is being developed, can only be appreciated by those who have attempted it. After the final meeting of the

Committee a very considerable period of time was absolutely essential for editing and issuing the report. The Committee had never given the Board the slightest cause for expectation that the report would be ready for presentation to the Society on June 27th, and the announcement in the programme of the Convention was wholly unwarranted.

The statements made at the Convention with regard to the great expense to the Society of Special Committees were calculated to throw the responsibility for this condition largely upon the shoulders of the Concrete Committee. This implication was unwarranted. The cost to the Society of the Concrete Committee during 1915 was \$128.46, all of which was for mileage. Previous to that time the only aid which the Committee had received during the twelve years of its existence was \$236 in 1911, this amount having been paid out for printing one hundred copies of a revision of the report. In May, 1913, an edition of the report was printed at a cost of \$392.30; but this was not for the benefit of the Committee. It appears, therefore, that prior to 1916 the total amount contributed by the Society to the work of the Committee was \$364.46.

The attempt made to discharge the Committee on the eve of its completion of a final report was discourteous, not only to the members of the Special Committee of this Society but to the other technical societies with which the American Society of Civil Engineers had been co-operating through the Joint Committee. This co-operation had been secured on the invitation of our Society, and it would seem as if common courtesy should prevent the relations being severed without due notice to the other interested parties.

The work of the Committee is now finished, and the members are glad to have complied with the wish expressed by some members of the Society that their work should be brought to a close. Their only regret in laying down the burden is that they should have to do so under the stigma placed upon them by the motion introduced, but not passed, at the Annual Convention.

I move that the report of the Special Committee on Concrete and Reinforced Concrete be received and the Committee be discharged.

(Motion seconded.)

THE PRESIDENT.—You have heard the motion that the Special Committee on Concrete and Reinforced Concrete be —

MR. FITZGERALD.—Mr. President, I should like to move an amendment to the motion. I should like to move the addition of two words to the motion, discharged "with thanks."

(Motion seconded.)

THE PRESIDENT.—I presume that the maker of the motion accepts the amendment. I will put the motion. All in favor of the motion please say "aye"; contrary minded, "no."

E. W. STERN, M. AM. SOC. C. E.—Inasmuch as this Committee now has been discharged, is it not in order that in view of the continual changing in the art of reinforced concrete construction and the movements that are being put into use almost daily, that a special standing committee of the Society be formed for the purpose of keeping up with the improvements in this most important art?

THE PRESIDENT.—I will call your attention to the fact that you are not speaking to the motion. There is a motion before the house.

MR. STERN.—I beg your pardon. I thought it was carried.

THE PRESIDENT.—The Chair put the motion without calling for any discussion on the motion. If there is any one desiring to discuss the motion, the Chair will be very glad to hear it. Mr. Davison, of Pittsburgh.

G. S. DAVISON, M. AM. SOC. C. E.—Mr. President, perhaps my question might not be germane to the motion, but I should like to ask it at any rate, in connection with the report: I understand that the Chairman of this Committee, Mr. Worcester, has received a communication from the Carnegie Steel Company in regard to a paragraph in the report on the subject of aggregates. I do not know what shape that letter was in, or what effect it had on the report, but I would like to ask Mr. Worcester if it was considered in the report, or not. It is just a matter of information before the Committee is discharged.

MR. WORCESTER.—Mr. President, I can only say that the letter was received, naturally after the completion of the final report of the Committee, and that the Committee has not had a chance to consider it.

MR. DAVISON.—Then I would like to ask if Mr. Worcester would care to have the Committee continued long enough to consider the letter, or does the Committee consider the matter closed? It is just a matter of information.

MR. WORCESTER.—Mr. President, it seems as if the Committee should be discharged at this time, the matter having appeared in the *Proceedings*, I presume that, in the natural course of events, it will be open for discussion by members of the Society, and that the discussion will also be printed in the *Proceedings*.

Whether or not it is worth while for the Committee to attempt to answer discussions, or whether we can leave it safely in the hands of the individual members of the Committee to answer the discussion, is a matter on which I do not care to express an opinion.

THE PRESIDENT.—Are you ready for the question? It is that the report of the Committee be received with thanks and the Committee discharged. If you are ready for the question, I will put it. All in favor please say "aye"; contrary minded, "no."

(Motion carried.)

MR. STERN.—Mr. President, may I make my motion now?

THE PRESIDENT.—Yes, Mr. Stern.



Mr. STERN.—I move that a standing committee of the American Society of Civil Engineers be appointed on Concrete and Reinforced Concrete, to carry out the work which this Committee has so splendidly completed up to date.

JOHN V. DAVIES, M. AM. SOC. C. E.—I would like to move as an amendment to that, that Mr. Stern's suggestion be referred to the Board of Direction for investigation before that Committee be appointed. I would like to say one word, though, in answer to Mr. Worcester, that I was the one who got into the trouble in Pittsburgh, and that the report as it has now come to us is a most admirable one, and we all feel, I think, a debt of gratitude to Mr. Worcester and his Committee for the work accomplished in this final report.

The trouble that the administration was in was that the Committee was 14 years in producing that report. And now that it has come, I hope Mr. Worcester will accept my apologies for anything that was discourteous. There was no intention to be discourteous, but the administration and myself, as a member charged with this particular duty, felt it an obligation to try and get some conclusion to the work of that Committee, or some action, after that long interval. There was no desire or intent to be discourteous, and I, for one, would lead in attributing to the Committee, and every member of it, the highest praise and the warmest thanks of this Society for the work that they have accomplished.

In respect to Mr. Stern's motion, I would like to move as an amendment that that matter be referred to the Board of Direction for consideration before action is taken in the matter.

G. S. WILLIAMS, M. AM. SOC. C. E.—I support Mr. Davies' amendment.

Mr. STERN.—I accept it.

SAMUEL WHINERY, M. AM. SOC. C. E.—Mr. President, whatever may be the merits of the motion just made, I raise the point of order that standing committees on subjects of that kind are not authorized in the Constitution. There are two types of committees provided for. A committee to report on any engineering subject is a "special committee", covered by distinct instructions in the Constitution. Such a thing as a standing committee on any engineering subject has no place under our Constitution at present.

THE PRESIDENT.—The Chair understands the motion of Mr. Stern to be that the Special Committee be reappointed.

Mr. STERN.—I used the words "standing committee". I will amend that by changing it to "special committee".

THE PRESIDENT.—The Chair understands the motion to be that a special committee be reappointed, constituted of the same members as the special committee just discharged, to consider —

MR. STERN.—I did not use the term "the same members". I did not say that the same members should be continued, but that a special committee should be formed —

THE PRESIDENT.—For what purpose?

MR. STERN.—For continuing the work on concrete and reinforced concrete, in order to keep the membership and the profession informed as to changes and improvements in the state of the art.

MR. WHINERY.—Mr. President, may I ask that you rule on the point of order that I raised?

THE PRESIDENT.—I rule the point well taken, and the Chair understands that this motion is for a new special committee, and that the amendment is accepted by the maker of the original motion, that the matter be referred to the Board of Direction. I see no objection to that.

T. K. THOMSON, M. AM. SOC. C. E.—Is it in order, sir, for me to make an amendment to that motion, that inasmuch as we have just received one of the best reports that we have ever had in the Society, that the whole Committee be requested to take office again, the same Committee, that we reappoint the old Committee.

THE PRESIDENT.—I see a little incompatibility between that motion and the amendment which has been accepted by the original maker of the motion, that the matter be referred to the Board of Direction. If it is referred to the Board of Direction, the Board of Direction would appoint anybody that they wished, in the interests of the Society. The question, as it now stands, is that a Special Committee on Concrete and Reinforced Concrete be appointed, and that this be referred to the Board of Direction. Are you ready for the question? All in favor will please say "aye"; contrary minded, "no".

(Motion carried.)

THE SECRETARY.—Before going further, may I say that I have some discussions of some of these reports, and I have assumed that the Annual Meeting would not care to take up the discussion by their presentation at this time, inasmuch as these discussions will go in the *Proceedings* in regular course. If I am not correct in that, and the Annual Meeting desires to have them presented, I have them here for that purpose.

THE PRESIDENT.—The Chair hears no motion on that suggestion; and I will call for the Final Report of the Special Committee to Investigate the Conditions of Employment of, and Compensation of, Civil Engineers, Nelson P. Lewis, Chairman. This report is printed in the December, 1916, *Proceedings*. Mr. Lewis —

N. P. LEWIS, M. AM. SOC. C. E.—Mr. President and Gentlemen. I do not know that I have any special explanation to offer, any defense or apology. I do not know whether you care to have the report read. It is brief.

THE PRESIDENT.—Just as you see proper. Skip as much as you want to.

MR. LEWIS.—I will skip the preliminary part of it. (Mr. Lewis read the latter part of the report.)

THE PRESIDENT.—A motion is in order.

MR. WILLIAMS.—I move that the report be accepted with thanks, and that the Committee be discharged.

(Motion seconded.)

THE PRESIDENT.—You have heard the motion, which is seconded. Any remarks?

G. M. PURVER, Assoc. M. Am. Soc. C. E.—Mr. Chairman, just a point of information. I would like to know whether the Committee, in canvassing the members, is able to tell us the percentage of the number of men they canvassed to the number of men employed in the profession.

The second point I would like to inquire is this: Did the Committee take the trouble to look up the salaries paid by Federal, State and municipal administrations? It has just occurred to me that that might be worthy of consideration.

As you know, there was recently announced an examination for structural engineers in the Navy. The requirements were that the man must be a Naval College graduate, must have had 6 years of experience or more, and been in responsible charge of work. The compensation was from \$4 a day to \$8.

However, after taking that examination, those who were highest on the list were offered positions at \$3.52 a day. I have no doubt that the Government will get enough men, and does get enough men, to show approximately the market price of engineers.

So much for the Federal service. With respect to the State administration, I think you will find that, whenever there is another examination, the requirement will be that candidates must be college graduates with 6 years of experience or more, and have had responsible charge of work, at salaries from \$1 500 up to \$1 800. These figures speak for themselves. Of course, I appreciate very much the work done by the Committee, and I know that under the circumstances, they have done their best, but, as a point of information, if they did look into the Civil Service, I should like to know whether they could tell approximately the percentage of men canvassed with the percentage of men employed. I would like to have the information, if possible.

MR. LEWIS.—Shall I answer the questions, Mr. President?

THE PRESIDENT.—If you please.

MR. LEWIS.—I cannot tell you, gentlemen, the number or the ratio between the number of our employees canvassed and the total number of men employed as engineers. It was impossible to secure that infor-

mation. We endeavored to collect statistics of men whom we were sure were engineers.

For instance, in the legal profession, you will find many men, registered and paid as lawyers, serving as law clerks, but I doubt if it would be proper or fair to include that vast army of law clerks in computing the average compensation or income of lawyers.

Now, there were a great many—the Committee did not refer to these—but there were a great many replies received, which were evidently written by men who felt that they were the subjects, the victims, of injustice. For instance, one man said, "I have no business ability in the common sense of the word. Engineers do important work for architects at small pay. Most engineers are fools."

A civil engineer in the War Department, of 27 years' experience, receiving \$2 700, says: "As there is no pension and few resign, there is little chance for advancement. What we need is a pension and compulsory retirement."

Another man, who earns \$1 200 a year, says that \$300 or \$400 of that is for engineering skill, and the rest for executive ability. A member of the Engineering Department says, "If I had to live my life over again, I would take up anything but engineering."

Another, who earns \$5 000 a year in private practice, says, "A large steel bridge company designs structures free of charge. Therefore, I often advocate reinforced concrete, though preferring steel."

Another says he earns \$1 650 a year. All these replies are from men who have had from 20 to 25 years of actual professional experience. Another man says, "We need more engineers who can talk in public in an entertaining way." Another man, who has had 10 years' experience as a mining engineer and 10 years in general practice, says, "Engineers are in the class of beggars or objects of charity. We do designing for any pittance. The more they waste, the better engineers they are."

Another says that conditions are very unsatisfactory, as the chief engineer, a person who is not technically educated, and even unable to divide one decimal by another without making a mistake, is not appreciative of highly trained technical men.

That is the material with which your Committee had to work, a good deal of it—a large proportion of it. If we had attempted to communicate with every man employed nominally as an engineer, our problem would have been vastly more difficult. I think the Committee did as well as it could with the material which it was able to secure.

W. H. BIXBY, M. Am. Soc. C. E.—I want to add a few words here, just because something has been said about the Government service. I think the members of the American Society of Civil Engineers, in deciding the question of proper compensation for their services, should not allow themselves to be restricted in any way, shape, or form by the

question of what salary is paid to an engineer by the Federal Government.

As Chief of Engineers, or at the head of a bureau that employs a large number of engineers, I have had considerable experience with them, from inside as well as outside; and the question of salary is not dependent on what the Chief of the Government Bureau thinks a man ought to receive for his services. It is simply, to a large extent, what the Committee of Congress is willing to put into an appropriation bill.

Time and time again the head of a bureau goes before a committee and says: "We have got to have more men; we have got to have men of more ability; we have got to be able to pay them higher salaries; you cannot have the work done properly unless you are willing to pay for it." But the reply comes from the Chairman of the Committee, "Well, General, I am very sorry to say it, but you managed to get along last year, and you will have to manage some way of getting along this year. We cannot give you any more men; we cannot let you pay them any more salary; we cannot let you substitute one man of high salary for two men of low salaries, even if he can do two or three times as much work. We have to remember that the finances of the country are such that we do not know how to raise the money; and we are going to cut down on the employees because they are under our control."

And when it comes to establishing salaries, during the last year or two that the matter has come up, as you remember now, if you follow the discussions in Congress, a member of Congress says: "Well, I object to paying a man on one of these permanent committees \$10 000 a year; that is more than I get; and I am not willing to admit that there is any man in the United States that is any more worthy of being paid than a member of Congress; and I am not going to allow any salaries that exceed mine, no matter what the ability is."

Starting with cabinet officers, the assistant secretaries, and other men at the head of the bureaus, it is well known that they do not get enough salary even to pay house rent. They certainly do not get enough to pay their expenses.

It is expected from a Government employee that he is ready to do a lot of work *pro bono publico*, for nothing, and it is not expected that he will ask for a salary which is a proper compensation for his services.

Just take it as it is at present in the discussions before Congress on the question of the retirement bill for all the Government employees. A great many of them are in favor of it. Nearly all the cabinet officers are in favor of it. They all say the men are not being paid properly, and you cannot get the proper kind of skill, at the price, and that compensation must be increased to get it. But when it comes up on the floor of Congress, they say, "Well, we have to economize some-



where. This is a place where we can cut down, and we will have to cut down at any rate. We have to reduce, not increase."

It is not a question of a man's ability, or of proper compensation. It is a question with them of the pursestrings, and, therefore, in a Society of this sort, to allow the compensation, as paid by the Federal Government, to be used as a basis, as a measure of proper compensation to an engineer for his services, is not the right method.

If you are going to establish a proper scale of compensation, you have to consider the salaries that are paid by private corporations and private business men around the country for the work that they want done, when they know that the quality of the work is going to be dependent on the ability of the man and on his services.

ISHAM RANDOLPH, M. AM. SOC. C. E.—Mr. President, what General Bixby says is true. During Mr. Taft's administration as President, I was at luncheon with him on one occasion, with another gentleman. He was talking of this very question of compensation. He said: "We have in the War Department a man who has been here for a long term of years, a man who has a fuller knowledge of the workings of the Department than any other man that I know in it; and when I want to know anything particular I send for that man, and sit down and talk with him." He said, "That man, if he were in the service of a railroad corporation, would be worth to them \$20 000 a year. This Government pays him \$3 600; and before I left the War Department I succeeded in getting that man raised to \$4 800."

That is the kind of compensation that this Government pays to its servants.

HENRY R. BUCK, M. AM. SOC. C. E.—Mr. President, as bearing on the point that if this Committee had gone outside, among a larger membership, this average salary might have been reduced, may we consider a little group of employees with which the speaker happens to be familiar? They are all city employees in two cities of Connecticut. There are 71 members in the group, all technically eligible to membership in this Society. They have practiced their profession as long as 40 or 45 years.

The group includes the chief engineers of these cities, who draw \$5 000 or \$6 000 a year. Of the total of 71 engineers, only 10 belong to the American Society of Civil Engineers. The total salaries drawn by the group is only \$105 000, and the average salary of the group is only \$1 480. Now, the average salary of the 10 members of this National Society is \$3 270, which compares favorably with the Committee's average, which was \$3 602, for all New England, or its general average for municipal engineers, \$2 994.

The 61 other members of the group average \$1 190. Now, in the last 2 years' work of the Committee, they went to 6 000 members of

local societies, securing replies from about 1500. This group averaged a salary of 20% less than those previously canvassed.

This is a step in the right direction, but is it enough? In this group of 71, only 10 members belonged to the Local Society, which this year's work of the Committee reached. Their salaries averaged \$2160; or, including the American Society members, \$2490. The salaries of the remainder of the group—the 51 poor fellows who could not afford to join any society—averaged only \$1090.

If the Committee could have gone to the bottom of the matter, I think it would have found that twenty-seventieths, or, rather, the 30% that reported their salaries, received two and a half times as much as the unreported salaries which the Committee could not reach; and consequently, would not the average salary of all practicing civil engineers in the country be about half the average figures shown on the diagram?

And is there not another point which we might consider: That the compensation of many engineers does not consist entirely in the financial return from their work. The engineer is doing a clean, useful piece of work, and I believe the average engineer gets the greater part of the satisfaction and compensation in life from the feeling that the world is a little better for his having worked in it.

MR. WILLIAMS.—Mr. President, I would like to offer a suggestion, that a man who pretends to be following the profession of civil engineering and does not unite himself with any of the organizations that are in existence for its advancement, is hardly worthy to be called a member of the profession.

CHARLES D. THOMAS, ASSOC. M. AM. SOC. C. E.—Mr. President, I would like to ask what the American Society of Civil Engineers does for the real advancement of engineers, so far as salaries are concerned?

MR. PURVER.—I want to say, in connection with what the previous speaker said about cutting down the average compensation, as shown by the report of the Society's Committee, that I canvassed about 600, and I accepted only those who would be qualified to be members of the Society. I did not canvass the Civil Service employees, only a few were there, but I was admitted by some of the most important engineering societies in the city, and they asked me not to mention the names. It figures out that the average salary of the 600, who would be qualified to become members of the Society, would be \$4000. I do not want to criticize the Committee. They have done the best under the circumstances, but I was wondering whether the figures they established do not include such a small percentage of the entire profession that it was really a pity that so much good work was wasted.

THE PRESIDENT.—The Chair wants to say, for the benefit of the gentlemen standing up in the hall, that there are seats in the front

rows, and there is also a large gallery, where they can have seats, if they choose to go up there.

H. W. HODGE, M. AM. Soc. C. E.—Mr. President, if the members, instead of berating the Government for paying low salaries, would demand proper compensation for their services, there would not be so much ground for complaint. In my business, I have run across many cut-rate artists in the engineering profession, who will do work for any kind of a price. Our fellow-engineers, I have no doubt, have met the same thing. If we would make a price worthy of our work and services, though we might perhaps scare many a client out of our offices, and not get his money, at least, we would gain his respect, and I think if engineers will make up their minds not to work for inadequate salaries, they will do more for themselves than by berating the Government and other people because they do not pay decent salaries.

MR. STERN.—Mr. President, as it has been said that there are 52 000 engineers, members of organizations occupying this building, would it not be a pertinent question to ask if the voices of those 52 000 engineers were heard at Washington that perhaps the members of Congress might take some action as regards remedying the poor compensation of the civil engineers in the Federal service?

THE PRESIDENT.—There is a motion before us that the report of the Committee be received with thanks, and that the Committee be discharged, and I will put the question. All in favor, please say "aye"; contrary minded, "no".

(Motion carried.)

THE PRESIDENT.—The next business is the Report of the Special Committee to Formulate Principles and Methods for the Valuation of Railroad Property and other Public Utilities, Frederic P. Stearns, Chairman. The Report is printed in the December, 1916, *Proceedings*.

FREDERIC P. STEARNS, PAST-PRESIDENT, AM. SOC. C. E.—Gentlemen: After five years of constant work, your Committee, appointed to Formulate Principles and Methods for the Valuation of Railroad Property and Other Public Utilities, has completed its final report which has been published in the December, 1916, issue of the *Proceedings* with the exception of four appendices, now in the hands of the Secretary, which will be published later.

While your Committee is fully alive to the fact that the art of valuation is still in formative condition, it is of the opinion that it has gone as far in this work as is advantageous.

The Committee, therefore, asks that it be discharged, with the understanding that the members may still rectify errors or make minor changes in the report before it is published in the *Transactions*, and, after ample time has been given for written and, if desired, oral discussion of the report, make a joint closure of the discussion, should it

appear desirable to them to do so in the light of the discussion which may be adduced.

MR. DAVIES.—Mr. President, the magnificent report that has been presented by the Special Committee on Valuation is something of which the Society should be proud, and the work that has been put into it by the members of that Committee represents a splendid achievement. It is particularly valuable to us, I think, from its opportune time of presentation; and I would like to move, as an amendment to what Mr. Stearns has said in asking for the discharge of the Committee, a resolution thanking the Committee for the work they have done and for the report they have tendered, and a resolution that the meeting refers to the Board of Direction, with power, the termination of the work and the discharge of the Special Committee on Valuation at such time as that Committee shall have completed its work in summing up and replying to discussions arising from the presentation of its final report.

(Motion seconded.)

THE PRESIDENT.—Do you accept the amendment?

MR. STEARNS.—Yes; if it is desired; only for the purpose that is mentioned.

THE PRESIDENT.—You have heard the motion and the amendment, and the maker of the motion accepts the amendment offered by Mr. Davies. Are there any remarks?

C. R. HARTE, M. AM. SOC. C. E.—Mr. President and Members of the Society, I should like to call the attention of the Society to the fact—with which you are doubtless familiar at this time—that the American Electric Railway Association has a Valuation Committee which has submitted a report containing a suggested terminology, a terminology that is quite different from that suggested by our Committee, and that the National Electric Light Association has a Valuation Committee considering such a terminology. Undoubtedly, other national associations are doing the same thing.

I think we will all agree that one of the very serious difficulties met in valuation matters has been their confusion over the terminology; and it would seem desirable, before this Committee is discharged, that some effort be made to see if uniform action cannot be had by the various societies.

I am authorized to say to the Society, for the American Electric Railway Association, through their President, Mr. Storrs, that they will recommend any such action looking toward the formation of a uniform terminology; and I therefore suggest that the Committee consider, or the Board of Direction, if the matter is to be referred to them—I am not offering this directly as a motion—that they consider whether it would not be well to have some joint conference with these other National Committees, in the hope of getting a joint agreement as to these various terms.

THE PRESIDENT.—Are there any further remarks? If not, I will put the question. You have heard the motion. It is somewhat long, but I think the gist of it is that the Committee wishes to discuss this matter after the discussion by the members is all in; and you have heard the suggestion to refer to the Board of Direction. All in favor will please say "aye"; contrary minded, "no".

(Motion carried.)

The next matter is a call for the report of the Special Committee to Codify Present Practice on the Bearing Value of Soils for Foundations, etc., Robert A. Cummings, Chairman. Is Mr. Cummings present?

ROBERT A. CUMMINGS, M. AM. SOC. C. E.—Mr. President and Fellow-Members of the American Society.—Your Committee expected at this time last year to have been able to give you a definite report on the Classification of Soils, and possibly laboratory procedure. We have been unable to accomplish this purpose because of two facts; first, that we have been investigated ourselves by the Board of Direction; and I am happy to be able to state to you that the Board has given us a clean sheet, and that it has authorized us to continue our work. It also has provided us with sufficient funds to complete this classification.

Your Committee has also noted the discussion of its last report, in the *Proceedings* of the Society during the past year, but, in the experience of the Committee, the classification there mentioned can be improved and modified. Modifications have been proposed by Dr. Charles F. Macdonald, formerly attached to the Panama Canal Commission, now the Geologist of the United States Bureau of Mines; also by Drs. Rogers and Shaw, Geologists, connected with the U. S. Geological Survey. These suggestions will have the very earnest consideration of your Committee, and no doubt part of them will be embodied in the report next year.

Something has been said about what the engineer does for the Government. This Committee takes the opportunity of presenting to you some of the things that the Government has done for the Committee. This pile of papers represents 860 articles that have been read, digested, and put into brief form for publication, in a bibliography that will be attached as an appendix to our report of this year.

This work was carried out by the Carnegie Library of Pittsburgh, through their Technology Department, and the acknowledgments of the Committee have been extended to them. The references are classified under the heads of natural phenomena, physical and chemical properties of soils, granular materials, foundations, retaining walls, including earth pressures, etc.



Your Committee is strongly of the opinion that it is vitally important to obtain as a basis of its work the physical properties of soils, that, in so far as it is practicable, the study of soils should be conducted along the general lines in vogue in the study of other materials of construction. With this in view, your Committee has been co-operating with the United States Bureau of Standards in their Government enterprises.

Largely because the problem of your Committee has been recognized by this Governmental Bureau as being of National importance, the attention of other scientific and technical institutions will be directed to the unusual opportunity presented for co-operation in this work.

THE PRESIDENT.—Are there any remarks? If not, we will pass to the next business. I call for the Report of the Special Committee on Stresses in Railroad Track, A. N. Talbot, Chairman.

A. N. Talbot, M. Am. Soc. C. E., presented the following report:

**"Progress Report of Special Committee to Report on Stresses in Railroad Track"**

"The Special Committee to Report on Stresses in Railroad Track, co-operating with a similar committee of the American Railway Engineering Association, presents the following report of progress:

"From the beginning, the Committee has felt that its work must be based on adequate experimental data derived from tests on standard railroad track, and it has also appreciated that because of the complexity of the action of railroad track under load, adequate experimental work would of necessity involve long, painstaking, and repeated tests, and sufficient time for reducing the data so obtained. Experience has shown that the anticipated difficulties were not over-estimated. The Committee feels that the experimental work has made encouraging progress during the past year. In this time the instruments used have been further developed; especially has the stremmatograph (the instrument for measuring strains in the rail under rapidly moving loads and for giving a continuous record of the action of the rail under and between the wheel loads of the moving locomotive) been the subject of further improvement, and new instruments have been made for larger rail sizes. Tests with the stremmatograph have also been made to find the usefulness of this instrument in determining the action of rails on curves, resulting in a considerable promise of success.

"During 1916, field tests conducted on the main line of the Illinois Central Railroad north of Champaign, Ill., have been made on rails of 85-lb., 125-lb., and 136-lb. sections, with the Mikado, the Pacific, and the Atlantic types of locomotives, running at various speeds, and results previously obtained have been checked and the gaps filled out. Tests have also been made on track with cinder ballast.

"During the fall the test party was engaged in test work on the track of the Delaware, Lackawanna and Western Railroad near Dover, N. J. Tests were made with four types of locomotives, run at various speeds, over track laid with 105-lb. rail. In addition to the strains in the rail, track depressions were measured. Static tests were made to

determine bending in ties and stresses in track. A few tests were made on curves. The data of those tests are now being worked up.

"Laboratory tests on the distribution of pressure downward through ballast material have been carried on. Apparatus has been installed and tests made with stone ballast, gravel ballast, and sand, using different depths of material and loads up to 50 000 lb. These tests are to be continued, and it is expected that the data will be of service in establishing laws on the distribution of pressure downward and laterally through ballast and other granular material.

"The work of reducing all test data has been carried on during the year, and while this part of the work has consumed a large amount of time the material is being put into satisfactory form for final record.

"Two meetings of the Joint Committee have been held during the year. At the meeting in Chicago, March 21st, 1916, eighteen members of the Joint Committee being present, the report of experimental work carried on in 1915 was presented and discussed in detail, and there was a discussion of the nature of the work to be carried on during the year. At the meeting held in Champaign-Urbana, Ill., May 10th and 11th, 1916, eleven members of the Joint Committee being present at the three sessions, the experimental work of 1915 was discussed, and plans and methods for further tests were considered at length.

"The Committee had expected before this to be able to report the data already obtained, but the work of studying and formulating the results of the experimental work has been time-consuming. A disability of the Chairman has further delayed the progress of the presentation of the data. However, the Committee is able to report progress in making up the report of the tests.

"Respectfully submitted,

"THE SPECIAL COMMITTEE TO REPORT ON  
STRESSES IN RAILROAD TRACK."

THE PRESIDENT.—If there are no remarks, we will pass to the next business.

MR. DAVIES.—Mr. President, there is one thing I would like to take up at this point, and that is in relation to the Special Committee on Floods and Flood Protection.

THE PRESIDENT.—I was going to bring that up, but you may go on.

MR. DAVIES.—A year ago, Col. Townsend, the Chairman of that Committee, tendered a final report. The Committee, by the action of the Annual Meeting, was continued to co-operate with the Special Committee on a National Water Law. Col. Townsend advises us that there was nothing to co-operate with, there was nothing to confer about, and at a later date the Board of Direction terminated the work of the Committee, as there was no further work for that Committee to perform.

Objection was made later to the action of the Board of Direction in terminating a Committee that had been extended and continued by the Annual Meeting, and, therefore, as a matter of form, I would like

to move formally the discharge of the Special Committee on Floods and Flood Prevention, which tendered its final report a year ago.

THE PRESIDENT.—Is the motion seconded?

(Motion duly seconded.)

THE PRESIDENT.—You have heard the motion. All in favor please say "aye"; contrary minded, "no".

(Motion carried.)

THE PRESIDENT.—Now, is there any new business to be brought before the meeting?

MR. PURVER.—Mr. President, under "New Business", perhaps it would not be out of order for me to make a few remarks, which I will formulate in a motion. As you all know, the present condition of Europe will revolutionize the present commercial relations in this country, and it appears to me that this is just a time when the American Society of Civil Engineers can do a great deal for the members of the profession. You all know that all the commercial enterprises and the United States Government expect a revolution in foreign commercial relations, and are sending out men to Russia and to South America to investigate conditions with respect to the employment of American capital.

I believe that, while commerce has always been the leading factor in our life, and engineering was considered as a necessary evil, it is about time it should turn around, that engineering should be the leading factor, because commerce will entirely collapse under the present waste of living, if the skill and the genius of the engineer do not come to help. It behooves this Society to initiate that movement, that they, without waiting for commerce to go ahead of them, should go to these foreign countries and investigate the conditions there for American engineers. I believe that members who are familiar with conditions in South America will join in that discussion.

As for myself, I will say that there is no country in this world that will adapt itself to the enterprising spirit of the American engineer as quickly as Russia. Its natural resources are practically unlimited, and though the Russian people have very little of the American genius, they place confidence in the American engineer.

If the Russian people wanted to learn philosophy or learn how to think, they used to go to Germany; but if they want to know how to act and to do things, and to learn engineering, they come to this country. So you see the American engineer is very popular in Russia, and, therefore, if you will, in the proper way, attack that situation, meet that situation, you will find that there are great opportunities for American engineers in Russia. I have traveled through Russia, covering distances from Petrograd to Vladivostock, and I will tell you, from my personal experience and knowledge of men and the country, that it is an exceptional opportunity for you, and it would be proper for

the American Society of Civil Engineers to appoint a Special Committee to gather information as to the opportunities for the American engineer in Russia.

I believe that they should not wait for their complete report, next year, or many years hence, but as the knowledge is being accumulated, it should be available to the members of the profession, particularly to those who would want to try their fortunes in the dominions of the Czar. I will put it again, in the form of a motion, and I wish you would consider this:

I move that the President of the American Society of Civil Engineers appoint a Committee of five to investigate and report on the conditions, on the opportunities, for American engineers in Russia.

THE PRESIDENT.—Is the motion seconded? You will understand that all appointments of special committees, under the rules, go first to the Board of Direction.

R. L. HUMPHREY, M. AM. SOC. C. E.—I move, sir, that that matter be referred to the Board of Direction.

(Motion seconded.)

THE PRESIDENT.—The motion is that the matter just spoken to be referred to the Board of Direction. If there are no more remarks, I will put the motion.

MR. PURVER.—At the suggestion of the members around me I will amend that motion, it should be to investigate the conditions, not only in Russia, but in South America. Those are the most important foreign countries—make it foreign countries.

THE PRESIDENT.—The motion has been extended to include South America. All in favor of the motion please say "aye"; contrary minded, "no".

(Motion carried.)

MR. BUCK.—Mr. President, many of you are no doubt familiar with the Student Branches organized in the American Society of Mechanical Engineers and in the American Institute of Electrical Engineers; and a group of Connecticut members of the American Society of Civil Engineers which I, for the moment, represent, is convinced that this Society would be greatly benefited if it were to be provided with some similar organization. The members of such student branches as we have in mind are the undergraduates of the engineering departments of the large technical schools.

The undersigned individually belonging to a group of Connecticut members of this Society who are in the habit of meeting together occasionally for the discussion of matters of professional interest, believing that the action suggested below would greatly benefit this Society, request the passage of the following resolution:

*Resolved:* That the Board of Direction be requested to investigate the wisdom of establishing student branches of this Society, similar to

the forty now successfully organized within the American Society of Mechanical Engineers, and the Board of Direction is requested to report to the Society and secure an expression of opinion and discussion from the membership in season for the matter to be presented, if desired, in the form of an amendment to the constitution to be discussed at the next annual meeting.

CALEB MILLS SAVILLE  
HENRY ROBINSON BUCK  
EDWARD W. BUSH  
C. C. ELWELL  
ROBERT E. WISE  
LUTHER H. BURT

CHAS. F. CHASE  
R. J. ROSS  
CHARLES J. BENNETT  
LEON F. PECK  
PAUL SHELDON

T. C. ATWOOD, M. AM. SOC. C. E.—In seconding that motion, I should like to add a few words to what Mr. Buck has said. These student branches, which have been formed in the other National Societies, have been found to be of great service, not only in stimulating interest among young engineers, which causes them later to join the societies, but in stimulating their interest in their work in college.

This is so strong that the head of the Civil Engineering Department in one of our leading universities told me recently that he had known of quite a few men who had adopted the mechanical or electrical engineering branches, merely because of the fact that those student branches of the National organizations were in the University, and they felt the advantage of fellowship in joining with those student branches, which they did not get in the civil engineering branch. I believe thoroughly that this Society should encourage all engineers to become better trained engineers; and one of the best opportunities we have is in establishing these student branches, wherein the National organization will assist the student organizations, which already exist in most large engineering schools, to secure good speakers for their meetings, and in all ways to attempt to encourage them, as they grow older, to join the National organization. A good illustration of that is the point which Mr. Buck brought up, in the discussion of the compensation of engineers, when he said that out of 71 engineers who were in two certain Connecticut cities, only 10 belonged to the National organization.

MR. THOMSON.—Mr. Chairman and Gentlemen.—Though I think this motion is a very good thing, and in the right direction, I would simply suggest to the Board that they investigate how it has worked in the Canadian Society, because they are trying to profit by experience, where they found the student members a very heavy burden in some respects. They are trying to remove them.

THE PRESIDENT.—The motion is that this matter be referred to the Board of Direction to report at the next Annual Meeting. Are you



ready for the question? All in favor, please say "aye"; contrary minded, "no".

(Motion carried.)

THE SECRETARY.—I have a communication from a member who could not get here, which he has asked me to present. Shall I read it?

THE PRESIDENT.—If you please.

The Secretary read the following letter:

"TOPEKA, KANSAS,

"JANUARY 12, 1917.

"The Secretary,

"American Society of Civil Engineers,

"New York City.

"DEAR SIR: If this reaches you in time, will you kindly place before the annual meeting the following motion:

"*Moved:* That this Society appoint a committee of three to formulate a plan for the systematic marketing of Engineering Services. The Committee to be empowered and directed to request the co-operation of the other National Engineering Societies, especially the Consulting, Mining, Mechanical, and Electrical Societies. The Committee be empowered to employ a competent progressive Engineer, if deemed advisable, to work out the details of such a plan. This Committee to be appointed by the President within a month and to distribute its preliminary plans to the members of the Society before the regular summer meeting of the Society. The Committee be empowered to spend not over \$5 000 for this purpose from the funds of the Society.

"Several years ago I presented a motion of similar intent to the annual meeting. Accompanying it was the motion calling for the report which has just been rendered you by your Committee on Compensation of Engineers. My intention in asking for that report was to obtain information to aid in systematising the marketing of engineering services, and this Committee has rendered valuable service, although it has not covered quite the ground which I had intended it should. I noticed in their report the Committee says that it has never been able to determine what was intended by the portion of the motion referring to the 'conditions of employment'. By this I intended that the proportion of lost time which the conditions of engineering work forces on most engineers should be stated with the compensation received, in order that the real net income of engineers might be determined. Furthermore, whether or not living expenses are allowed, travel expenses reporting to and returning from a piece of work were received and other items which cut down the actual net receipts which finally decide the scale of living of a man. I fully realize the difficulties in the way of obtaining this information, and it is partly for that reason that I have, in the motion just presented to you, provided for the employment of an engineer to actually handle the details of the work. In my own investigation for the Government I find it extremely difficult to obtain such information of value by writing for it. It generally requires a personal visit.

"The engineer of to-day is or should be a business man, for otherwise a very large part of his technical skill will be useless simply because it will not materialize. But engineers have been slow to realize this and have often justified the criticism of their clients that they were all right for theory, but if you wanted anything accomplished you must get a business man to take charge of it. This opinion of the engineer has placed lawyers and merchants, and in fact every other kind of a man but an engineer on the large commissions dealing exclusively with engineering work. The New York commissions and the former Directors of The Port of Boston are sufficient examples of this. It is common to hear the appointing power say, 'We can hire plenty of Engineers for the technical part, but we must have a business man to decide the policies of this Commission'. We Engineers individually can do little to counteract such tendencies, but the large National Societies are in a position to secure a hearing when they speak, and so far that voice has been very feeble. These National societies have taken refuge in the idea that they were organized to promote the extension of technical knowledge. This was undoubtedly true and justifiable for many years after the societies were formed, for that was before the day of the present numerous and excellent publications dealing with technical knowledge. But except for the purpose of formulating standards this feature of the Society is fast lapsing into a duplication of the work of the Technical Journals and of the published reports of the various organizations actually doing the work, such for example as the Report of the Los Angeles Aqueduct. The time has therefore arrived when the energies and resources of the Society must largely be directed in other channels and the natural and obvious work waiting for these Societies to accomplish lies along the business and human sides of engineering activity. In fact the time is ripe for the engineering profession to reach out and grasp the authority in the direction of human affairs which is its right by virtue of the return in work accomplished which it renders to the community. Indeed, it is its duty, and engineers in their organizations have been too long neglectful of that duty. For of what benefit is it to the public whom we serve to design a technically perfect work if the power to authorize that work or to cripple it lies in the hands of men who are ignorant of the very first principles of engineering.

"In its larger features the motion I have just proposed is intended to organize the power of the great National Societies, to make effective the large work of the engineering profession and to prevent its being crippled through the appointment of ignorant men to positions of power over engineering work. It is to provide machinery whereby the organized opinion of the engineering profession expressed through its National Societies, may quickly make itself felt when for instance a Governor attempts to appoint on a commission having control of large engineering work, politicians, lawyers, merchants, blacksmiths, etc. In its smaller features this motion intends to provide for working out the details of an Engineering Exchange where Engineers may register their qualifications, file their credentials, and thereafter have the Society furnish prospective employers with certified copies of these credentials, thus doing away with the present inadequate system

of references which requires a new letter from former employers every time an Engineer seeks a new job. It furthermore means that the agents of the Society would watch the market and when it is learned that a community intends some development like a city water works, it would inform the City authorities of the class of engineers required to properly and economically handle such work, of the salary necessary to secure a properly equipped man, and if desired, would furnish a list of several such men who were available. Engineers requiring a force of men would have a reliable source from which to draw, which is not the case at present. It would prevent waste which now occurs in county work all over the country through ignorant supervision. I know of one county in one of the Middle States whose road and bridge work yearly amounts to several hundred thousand dollars, where in succession a barber and a waiter from a cheap restaurant have been elected county engineers, responsible for the design and construction of these works. These men after finishing their term of office have set up as consulting engineers and still further wasted the money of that community. This record can be duplicated all over the country and the National Engineering Societies are directly responsible for the continuation of this condition.

"We are all familiar with these conditions. Most of us would like to see them remedied. We can only remedy them by concerted action and such action should come from National Societies. It is not expected that the Committee proposed by this motion will be able to fully remedy them, but it will make a beginning, will give us something which can be revised and out of which a working basis may be developed. I sincerely hope that the meeting will act favorably on this motion.

"Respectfully,

"PERCIVAL M. CHURCHILL, Assoc. M."

THE PRESIDENT.—You understand that, under the rules, the appointment of the Committee proposed in this communication must go to the Board of Direction.

MR. FITZGERALD.—Mr. President, if the American Society of Civil Engineers is to enter into a process of watching the markets closely, I should like to make a suggestion that it be not too closely, in order that we may not get into the position now confronting the country, of investigation by a commission or a committee of Congress.

THE PRESIDENT.—What is your pleasure on this motion? Any further remarks? If not, I will put the question. All in favor of the motion please say "aye"; contrary minded, "no". The Chair is in doubt.

A MEMBER.—What are we voting on?

THE SECRETARY.—The motion is to refer this matter to the Board of Direction for report.

THE PRESIDENT.—Are you ready for the question?

GEN. BIXBY.—The question is still open for a little discussion; is it not? I would like to add, in this connection, that during the time I was in Washington as Chief of Engineers, I had occasion to know of cases where cabinet officers desired the services of men of engineering

knowledge, qualified for positions which they had to fill, where they were unable to get the proper men, and where, under the policy of this Society, it was impossible to get any statement from officials of the Society which would even give the names of half a dozen, or a dozen, or two dozen members of the Society who were especially so qualified. Now, if it had been mechanical work, we could have gone to the Mechanical Engineers and got a list, but for strictly engineering work it was impossible. Therefore, the men who were applied to for names had to give them on their own personal responsibility and from their own personal knowledge, and, therefore, they were not able to make up such a list of names as would have been advisable to put in the hands of a cabinet officer.

Now, I do not think the Society ought to organize anything by which they would recommend one man alone, but in a society of this magnitude, it ought to be able, when a position is to be filled, to give the names of half a dozen or a dozen, two dozen, or three dozen men, all of whom would be well qualified to fill the positions, and put the names of those men in the hands of the cabinet officers, so that they could look them over and pick out from them some man. I think the country would be much more benefited than it is if they are going to be forced to get names from persons who are merely tied up with the political situation.

B. M. WAGNER, M. AM. SOC. C. E.—In addition to what has been said by the able speaker who has preceded me, I wish to call attention to the fact that in Europe, in all the large engineering societies, civil, electrical, or any other, it is considered one of their most important functions to take care of their members. If you consult their records, you will see not only a list of men seeking positions, but a list of positions seeking men, and I think the function covered by that resolution is one to which this Society should give grave attention, and, if possible, adopt.

MR. STERN.—I am of the opinion that the time is now ripe for this Society to go right into the employment bureau business. I think it is a proper function of this organization to have an employment bureau, and I have thought so for some time.

MR. DAVIES.—Mr. President, if I am not mistaken, I think there is already a Committee, of which Professor Newell is Chairman, to investigate the very matter that is now presented to us, of an employment bureau.

THE PRESIDENT.—Quite right.

MR. DAVIES.—I would move as an amendment that this matter be referred to that Committee.

(Motion seconded.)

G. F. SWAIN, PAST-PRESIDENT, AM. SOC. C. E.—May I suggest that this be referred, as an original motion, to the Board of Direction? It will then be in the power of the Board of Direction to act on it.

A MEMBER.—I think you want to refer that a little too much. Why not have action on the original motion?

MR. WAGNER.—The rule is, in regard to special committees, that they have to go through a regular routine.

A MEMBER.—Is this not all out of order?

THE PRESIDENT.—The point is well taken. A vote was taken, but the votes were not counted. The Chair was intending to put the motion again, and have the votes counted right from the beginning. If there is no objection made, I will do that now. The question is on referring this communication, which has been read, to the Board of Direction. All in favor of that motion will please raise their right hand. Contrary minded. It is a vote.

(Motion carried.)

THE PRESIDENT.—I now call for announcements.

THE SECRETARY.—Mr. President, everybody has the programme, and I want to call attention to the fact that after two o'clock the Registration Bureau for this meeting will be in the 57th Street Building, and not here. I hope everybody will register before leaving.

For the visit to Hell Gate Bridge a special train will be provided at 42d Street and Vanderbilt Avenue, on the street, at 2.30 P. M., sharp. All who go on that excursion are requested to meet at that point. I understand they cannot hold the train very long.

I do not think there is anything further to say, sir, except that I have one or two letters, one from Mr. George A. Harwood.

"NEW YORK, JAN. 11TH, 1917.

"Mr. Charles Warren Hunt, Secy.,  
"American Society of Civil Engineers,  
"220 West 57th Street, City.

"MY DEAR MR. HUNT: In addition to the excursion scheduled on the program for the annual meeting of the Society, it occurs to me that possibly some of the members will be interested in viewing the Grand Central Terminal. If there are any who would be interested I would be glad to make arrangements to have them shown around.

"Yours very truly,

"GEO. A. HARWOOD."

I have another from the American Institute of Electrical Engineers.

"AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS  
"33 WEST THIRTY-NINTH STREET,  
"NEW YORK.

"JANUARY 15, 1917.

"Mr. Charles Warren Hunt, Secretary,  
"American Society of Civil Engineers,  
"220 West 57th Street, New York, N. Y.

"DEAR MR. HUNT: On behalf of the American Institute of Electrical Engineers I take pleasure in extending to the visiting members and



guests of the American Society of Civil Engineers all privileges of the Members' Rooms of our Institute during Wednesday, January 17, 1917. It is our desire that your members and guests may use the Members' Rooms of this Institute as freely as if they were entirely at home in their own building.

"Very truly yours,

"F. L. HUTCHINSON,  
"Secretary."

Another on behalf of the American Institute of Mining Engineers.

"AMERICAN INSTITUTE OF MINING ENGINEERS,  
"29 WEST 39TH STREET, NEW YORK, N. Y.

"JANUARY 15, 1917.

"Mr. Charles Warren Hunt, Secretary,  
"American Society of Civil Engineers,  
"220 West 57th Street, New York, N. Y.

"MY DEAR SIR: On behalf of the American Institute of Mining Engineers, I take great pleasure in extending to the visiting members and guests of the American Society of Civil Engineers all privileges of the Members' Rooms of the said Institute during Wednesday, January 17, 1917. It is our desire that your members and guests may use the Members' Rooms of this Institute as if they were entirely at home in their own building for purposes of sociability, writing letters, telephoning and other purposes that may be of convenience to them.

"Cordially yours,

"BRADLEY STOUGHTON,  
"Secretary."

I may say that I have had a similar letter from the American Society of Mechanical Engineers, but it is not here. Mr. President, the next thing that I have is the report of the Tellers.

MR. WILLIAMS.—Mr. President, I move that the Secretary be instructed to express to the Secretaries of the various Societies the appreciation of this meeting for the courtesies extended.

(Motion seconded.)

THE PRESIDENT.—All in favor of the motion please say "aye"; contrary minded, "no". It is a unanimous vote.

(Motion carried.)

THE PRESIDENT.—Report of the Tellers.

The Secretary read the Report of the Tellers, as follows:

"220 WEST 57TH ST.,  
NEW YORK, N. Y.  
"JANUARY 17TH, 1917.

"TO THE SIXTY-FOURTH ANNUAL MEETING  
AMERICAN SOCIETY OF CIVIL ENGINEERS:

"The Tellers appointed to canvass the ballots for Officers of the Society for 1917 report as follows:

"Total number of ballots received.....	1971
Ballots without signatures.....	18
" stamped, not signed.....	9
" from members in arrears of dues.....	11
Total number not entitled to vote.....	38
Ballots canvassed.....	1933
Defective .....	38

*"For President:*

GEORGE H. PEGRAM.....	1920
Scattering .....	7

*"For Vice-Presidents:*

GEORGE W. KITTREDGE.....	1909
GEORGE S. WEBSTER.....	1913
Scattering .....	17

*"For Treasurer:*

GEORGE W. TILLSON.....	1927
Scattering .....	2

*"For Directors:*

District No. 1	{	ALFRED D. FLINN.....	1890
		LEWIS D. RIGHTS.....	1891
		Scattering.....	16
District No. 3	{	WILLIAM R. HILL.....	1883
		Scattering.....	6
District No. 5	{	ARTHUR P. DAVIS.....	1877
		Scattering.....	5
District No. 7	{	W. L. DARLING.....	1887
		Scattering.....	1
District No. 12	{	R. H. THOMSON.....	1879
		Scattering.....	4

"B. F. CRESSON, JR.  
 CLIFFORD B. MOORE  
 ROBERT W. BOYD  
 NOAH CUMMINGS  
 RICHARD H. GILLESPIE  
 ALEXANDER HARING  
 HENRY B. MACHEN."

*Tellers.*

THE SECRETARY.—Mr. President, I think it would be in order to escort the new President to the Chair.

THE PRESIDENT.—You have heard the report of the Tellers, and in accordance with that the next thing is the induction of the new President to the Chair. I may be allowed, before that takes place, to express how highly I have appreciated the privilege of working for this Society and the advancement of the profession in the office which I have held, which came to me, as you may say, accidentally.

(The new President was escorted to the Chair by Desmond Fitzgerald and John A. Ockerson, Past-Presidents, Am. Soc. C. E.)

GEORGE H. PEGRAM, PRESIDENT, AM. SOC. C. E.—Gentlemen, the hour is so late that it would not be becoming for me to detain you. I desire to thank you for this great honor which, probably, to an engineer, is valued more than any other. I feel an especial embarrassment in immediately succeeding the man who has filled this office so conspicuously, Mr. Clemens Herschel.

Mr. Herschel has confided to me that a year passes very quickly. I do not think he alluded to the arduous nature of the work so much as to his desire to enter that select society of Past-Presidents.

I believe that this terminates the proceedings, and a motion to adjourn will be in order.

THE SECRETARY.—Mr. President, before we adjourn, I would like to announce that a meeting of the Board of Direction will be held immediately upon the adjournment of this meeting on the fifth floor, and for the comfort of the Directors, I will say that lunch will progress during that meeting. You all understand that, immediately after the meeting adjourns, Members of the Board will go to the fifth floor for luncheon.

(Meeting adjourned.)

### EXCURSIONS AND ENTERTAINMENTS AT THE SIXTY-FOURTH ANNUAL MEETING

**Wednesday, January 17th, 1917.**—After the Business Meeting, in the United Engineering Society's Building, 29 West 39th Street, lunch for about 700 members was served.

At 2.30 P. M., through the courtesy of the Public Service Commission for the First District, D. L. Turner, M. Am. Soc. C. E., Acting Chief Engineer; the Rapid Transit Subway Construction Company, George H. Pegram, President, Am. Soc. C. E., Chief Engineer; and the Holbrook, Cabot and Rollins Corporation, George H. Clark, M. Am. Soc. C. E., Chief Engineer, Contractors; about 70 members made an inspection of the Diagonal Station, included in the connection between the new Lexington Avenue subway and the present subway under Park Avenue in the vicinity of the Grand Central Station.

Another party of about 40 members inspected the new Broadway subway in the vicinity of Times Square.

At the same hour, by invitation of Gustav Lindenthal, M. Am. Soc. C. E., and under the auspices of the American Bridge Company, Fraser Brace and Company, McClintic-Marshall Company, and Snare and Triest, Contractors, a party of about 125 members visited and inspected the Hell Gate Bridge of the New York Connecting Railroad.

At 9 P. M. there was a Reception, with dancing, at the House of the Society, at which the attendance was about 440.

**Thursday, January 18th, 1917.**—The day was devoted to an excursion on the East and Hudson Rivers. Starting from the Battery at 10 A. M., one of the Municipal Ferry Boats, *The Brooklyn*, kindly furnished through the courtesy of Hon. R. A. C. Smith, Commissioner of Docks and Ferries, conveyed a party of about 600 members and their guests north on the East River, passing under the Brooklyn, Manhattan, Williamsburg, Queensborough, and Hell Gate Bridges, and going as far as Fort Schuyler, on Long Island Sound. The boat then returned by the same route to the Battery, where a stop was made in order to accommodate those who wished to land. From the Battery the steamer continued up the Hudson River along the New York shore as far as Spuyten Duyvil, affording a view of the various Railroad and Transatlantic Steamship Terminals, Riverside Park, and the site of the proposed relocation of the New York Central and Hudson River Railroad tracks. The steamer returned along the New Jersey shore, passing the Palisades and various railroad and steamship terminals, as far as the Narrows and Fort Hamilton and then along the Brooklyn shore and through Buttermilk Channel, passing the new City piers, in the Gowanus Section, the Bush Terminal, and Bay Ridge Parkway, and arrived at the Battery at about 4 P. M.

Lunch was served on board during the trip.

In the evening, at the Society House, there was a Lecture by John Howard Whitehouse, Esq., Member of Parliament, on the Changes in Economic and Social Conditions in England due to the War. This was followed by a social and informal smoker, at which the attendance was about 800.

The following list contains the names of 776 members of various grades who registered as being in attendance at the Annual Meeting. The list is incomplete, as some members failed to register, and it does not contain the names of any of the guests of the Society or of individual members. It is estimated that the total attendance was about 1200.

Ackeman, A. S....	Rahway, N. J.	Baldwin, W. J., Jr.	New York City
Ackerman, J. W....	Auburn, N. Y.	Balcom, H. G....	New York City
Adams, E. G.....	New York City	Ball, Lawrence A..	New York City
Addis, W. G.....	Winthrop, Mass.	Ballinger, W. F..	Philadelphia, Pa.
Aertsen, Guillaem,		Bamford, W. B...	Trenton, N. J.
	Philadelphia, Pa.	Barnes, O. F....	Jersey City, N. J.
Aiken, W. A.....	New York City	Barney, P. C....	New York City
Aikenhead, J. R...	New York City	Barney, S. E....	New Haven, Conn.
Atkinson, Asher,		Bascome, W. R...	New York City
	New Brunswick, N. J.	Basinger, J. G....	New York City
Alderson, A. B.,		Bates, W. B.....	Roanoke, Va.
	West Hartford, Conn.	Baum, George....	New York City
Alexander, H. J...	New York City	Bean, G. L.....	Philadelphia, Pa.
Allen, E. Y.....	New York City	Becker, E. J....	Schenectady, N. Y.
Allen, F. W....	Mount Vernon, N. Y.	Beekman, J. V., Jr.	New York City
Allen, Kenneth....	New York City	Belzner, Theodore.	New York City
Allen, W. H.....	Brooklyn, N. Y.	Bensel, J. A.....	New York City
Amburn, W. W....	Portland, Ore.	Bentley, J. C....	Elizabeth, N. J.
Ammann, O. H....	New York City	Berger, John....	New York City
Anderberg, Edward.	New York City	Bettes, C. R..	Far Rockaway, N. Y.
Anderson, W. T.,		Beugler, E. J....	New York City
	Forest Hills, N. Y.	Billings, A. W. K..	New York City
Andrews, G. C.....	Buffalo, N. Y.	Bilyeu, C. S.....	New York City
Appleton, T. A....	Beverly, Mass.	Bixby, W. H....	Washington, D. C.
Arend, A. C.....	Omaha, Nebr.	Blackwell, P. A....	Roanoke, Va.
Arnold, W. H....	New York City	Blair, C. M....	New Haven, Conn.
Ashmead, P. H....	New York City	Blakeley, G. H.,	
Atwater, H. C.	White Plains, N. Y.		South Bethlehem, Pa.
Atwood, T. C....	New Haven, Conn.	Blakeslee, H. L.	New Haven, Conn.
Atwood, W. G.	Chattanooga, Tenn.	Blanchard, A. H...	New York City
Babcock, W. S...	New York City	Bleistein, B. J....	Astoria, N. Y.
Baird, H. C.....	New York City	Blossom, Francis..	New York City
Baldwin, W. J...	New York City	Boardman, H. E...	New York City



- Boardman, H. S. . . . .Orono, Me.  
 Boardman, W. H. . . .Newark, N. J.  
 Bogart, John. . . . .New York City  
 Bogert, C. L. . . . .New York City  
 Bond, G. W., Jr. Weehawken, N. J.  
 Bonnett, C. P. New Rochelle, N. Y.  
 Bontecou, Daniel. Kansas City, Mo.  
 Booth, G. W. . . . .East Orange, N. J.  
 Bortin, Harry. . . . .New York City  
 Boucher, W. J. . . . .New York City  
 Boyd, R. W. . . . .New York City  
 Brace, J. H. . . . .New York City  
 Bradbury, R. R.,  
     Pleasantville, N. Y.  
 Bradley, F. E. . . . .New York City  
 Braine, L. F. . . . .New York City  
 Breed, H. E. . . . .Albany, N. Y.  
 Brendlinger, P. F.,  
     Philadelphia, Pa.  
 Brennan, J. G. . . . .Albany, N. Y.  
 Briggs, J. A. . . . .New York City  
 Briggs, W. C. . . . .Brooklyn, N. Y.  
 Brodie, O. L. . . . .New York City  
 Brown, A. T. . . . .New York City  
 Brown, E. H. . . . .Hempstead, N. Y.  
 Brown, T. E. . . . .New York City  
 Brown, W. E. . . . .Brooklyn, N. Y.  
 Brunner, John. . . . .Chicago, Ill.  
 Brush, W. W. . . . .New York City  
 Bryan, C. W. . . . .New York City  
 Bryson, Andrew. . . .New Castle, Del.  
 Buck, H. R. . . . .Hartford, Conn.  
 Buck, R. S. . . . .New York City  
 Budd, P. H. . . . .New York City  
 Buehler, Walter. . . .Chicago, Ill.  
 Buel, A. W. . . . .New York City  
 Buettner, O. G. H.,  
     New York City  
 Burgess, G. H. . . . .Albany, N. Y.  
 Burr, G. L. . . . .White Plains, N. Y.  
 Burr, W. H. . . . .New York City  
 Burroughs, H. R. . . .New York City  
 Bush, E. W. . . . .Hartford, Conn.  
 Bush, H. D. . . . .Baltimore, Md.  
 Bush, Lincoln. . . . .New York City  
 Campbell, C. C. . . .Philadelphia, Pa.  
 Carey, E. G. . . . .Bridgeport, Conn.  
 Carey, M. L. . . . .Albany, N. Y.  
 Carle, N. A. . . . .Newark, N. J.  
 Carpenter, C. E. . . .Yonkers, N. Y.  
 Carpenter, R. C. . . .Ithaca, N. Y.  
 Carr, Albert. . . . .East Orange, N. J.  
 Carson, H. Y. . . . .New York City  
 Carstarphen, F. C. . .Trenton, N. J.  
 Castleman, F. L. . . .Philadelphia, Pa.  
 Chase, C. F. . . . .New Britain, Conn.  
 Chester, J. N. . . . .Pittsburgh, Pa.  
 Chevalier, W. T. . . .Brooklyn, N. Y.  
 Childs, O. W. . . . .Washington, D. C.  
 Chipman, Paul. . . .Mt. Carmel, Ill.  
 Christian, G. L. . . .New York City  
 Christie, W. W. . . .Paterson, N. J.  
 Church, E. C. . . . .New York City  
 Church, I. P. . . . .Ithaca, N. Y.  
 Churchill, C. S. . . .Roanoke, Va.  
 Clark, A. E. . . . .New York City  
 Clark, G. H. . . . .New York City  
 Clarke, E. W. . . . .Pleasantville, N. Y.  
 Clarke, G. C. . . . .New York City  
 Closson, E. S. . . . .Montclair, N. J.  
 Cobb, L. R. . . . .Montclair, N. J.  
 Codwise, H. R. . . .Brooklyn, N. Y.  
 Cogswell, W. B. . . .Syracuse, N. Y.  
 Cohen, A. B. . . . .Hoboken, N. J.  
 Cole, G. N. . . . .New York City  
 Coleman, J. F. . . .New Orleans, La.  
 Colyer, C. I. . . . .Montclair, N. J.  
 Conger, A. A. . . .Worcester, Mass.  
 Conklin, C. D., Jr.,  
     Cheltenham, Pa.  
 Connelly, J. A. A. . .New York City  
 Constant, F. H. . . .Princeton, N. J.  
 Cook, J. H. . . . .Paterson, N. J.  
 Coombs, S. E. . . . .Yonkers, N. Y.  
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- Spear, P. H.,  
     Hastings-on-Hudson, N. Y.  
 Spencer, Herbert...New York City  
 Sperry, H. M.....New York City  
 Spilsbury, E. G...New York City  
 Spooner, A. N....New York City  
 Spooner, R. N....New York City  
 Sprague, E. L., Jr.Elizabeth, N. J.  
 Stark, C. W.....New York City  
 Starrett, W. A....Madison, N. J.  
 Stearns, E. B....New York City  
 Stearns, F. L....Scarsdale, N. Y.  
 Stearns, F. P.....Boston, Mass.  
 Stearns, R. H....Providence, R. I.  
 Stein, J. B.....Brooklyn, N. Y.  
 Stein, M. F.....New York City  
 Steinman, D. B....New York City  
 Stengel, C. H....New York City  
 Stern, E. W.....New York City  
 Stevenson, W. F.,  
     New Rochelle, N. Y.  
 Stewart, S. J.Poughkeepsie, N. Y.  
 Storey, F. S.....New York City  
 Stowitts, G. P.....Yonkers, N. Y.  
 Strachan, Joseph..Brooklyn, N. Y.  
 Strobel, C. L.....Chicago, Ill.  
 Strong, J. B.....Hillburn, N. Y.  
 Stuart, F. L.....New York City  
 Sturtevant, C. W..New York City  
 Sutton, C. W.....New York City  
 Sutton, Frank..Washington, D. C.  
 Swain, G. F.....Boston, Mass.  
 Swezey, E. C....Brooklyn, N. Y.  
 Swindells, J. S....New York City  
 Taber, G. A.....Brooklyn, N. Y.  
 Taft, J. R.....New York City  
 Tait, Harold,  
     Long Island City, N. Y.  
 Talbot, A. N .....Urbana, Ill.  
 Talbot, Earle....Englewood, N. J.  
 Tallman, Leroy...Brooklyn, N. Y.  
 Tallman, P. B....New York City  
 Taylor, C. F.....New York City  
 Taylor, E. A.....Portland, Ore.  
 Taylor, H. W.....New York City  
 Taylor, S. A.....Pittsburgh, Pa.  
 Tenney, W. R....Brooklyn, N. Y.  
 Theban, J. G....New York City  
 Thomas, C. D....Brooklyn, N. Y.  
 Thomes, E. H....New York City  
 Thompson, H. C.,  
     Weehawken, N. J.  
 Thompson, S. C...New York City  
 Thomson, S. F....Brooklyn, N. Y.  
 Thomson, T. K....New York City  
 Thomson, W. B...Cleveland, Ohio  
 Tidd, A. W...White Plains, N. Y.  
 Tighe, J. L.....Holyoke, Mass.  
 Tilden, C. J.....Baltimore, Md.  
 Tillson, G. W....New York City  
 Tombo, Carl....Philadelphia, Pa.  
 Tomlinson, C. P..Hartford, Conn.  
 Tower, J. W.....New York City  
 Trautwine, J. C., Jr.,  
     Philadelphia, Pa.  
 Travell, W. B....New York City  
 Tretter, G. A.....Roanoke, Va.  
 Tribus, L. L.....New York City  
 Triest, W. G.....New York City  
 Trow, F. H.....Kingston, N. Y.  
 Trowbridge, D. S..New York City  
 Turner, D. L.....New York City  
 Tuska, G. R.....New York City  
 Tuttle, A. S.....New York City  
 Ungrich, M. J....New York City  
 Upton, Joseph....New York City  
 Valley, Wm. P...Brooklyn, N. Y.  
 Value, B. R.....New York City  
 Vandervoort, B. F.Brooklyn, N. Y.  
 Van Norden, E. M.,  
     Brooklyn, N. Y.  
 Vincent, J. I.....New York City  
 Vogel, J. L....Jersey City, N. J.  
 Vroman, Guy...Larchmont, N. Y.  
 Vrooman, Morrell,  
     Gloversville, N. Y.

- Waddell, J. A. L., Kansas City, Mo. Wiggin, E. W. New Haven, Conn.  
 Wadsworth, J. E. New York City Wiggin, T. H. Scarsdale, N. Y.  
 Wagner, B. M. New York City Wigley, C. G. Trenton, N. J.  
 Wagner, S. T. Philadelphia, Pa. Wilcock, Frederick, Brooklyn, N. Y.  
 Wait, B. H. Poughkeepsie, N. Y. Wiley, W. H. New York City  
 Waite, D. C. New York City Williams, C. G. Plainfield, N. J.  
 Walker, C. L. Ithaca, N. Y. Williams, G. S. Ann Arbor, Mich.  
 Walker, J. J. Dobbs Ferry, N. Y. Williams, J. P. J. New York City  
 Walton, H. C. Boston, Mass. Willoughby, J. E.,  
 Warnock, W. H. New York City Wilmington, N. C.  
 Warren, H. A. Baltimore, Md. Wilmot, James. New York City  
 Wasser, T. J. Jersey City, N. J. Wilmot, Sydney. New York City  
 Watkins, F. W., Philadelphia, Pa. Wilson, P. H. Philadelphia, Pa.  
 White Plains, N. Y. Wilson, W. T. New York City  
 Watson, R. M. Rutherford, N. J. Winsor, F. E. Providence, R. I.  
 Webster, G. S. Philadelphia, Pa. Winsor, G. A. Pleasantville, N. Y.  
 Webster, J. M. New York City Wise, C. R. Passaic, N. J.  
 Wegmann, Edward. New York City Wise, R. S. Passaic, N. J.  
 Weitzner, H. M. New York City Witmer, F. P. New York City  
 Wells, C. E. White Plains, N. Y. Woehrlin, G. J. Brooklyn, N. Y.  
 Welty, H. T. Yonkers, N. Y. Wolcott, C. S. Hornell, N. Y.  
 Wendt, E. F. Washington, D. C. Wolfe, F. G. Scranton, Pa.  
 Wentworth, G. L. Yonkers, N. Y. Wolff, R. B. New York City  
 Werbin, I. V. New York City Wolpert, Otto. New York City  
 Wertheimer, Max. Cleveland, Ohio Wood, G. P. Peekskill, N. Y.  
 Weston, R. S. Boston, Mass. Woodard, S. H. New York City  
 Weymouth, Aubrey, Woodcock, H. W. Brooklyn, N. Y.  
 New York City Worcester, J. R. Boston, Mass.  
 Weymouth, F. E. Denver, Colo. Wright, J. B. New York City  
 Wheatcroft, H. B., Jr.,  
 New York City  
 Wheeler, R. C. Summit, N. J. Yates, J. J. New York City  
 Wheeler, W. S. New York City Yates, P. K. New York City  
 Whinery, Samuel. New York City Yereance, A. W. New York City  
 Whitcraft, L. N. Hackensack, N. J. Yereance, W. B. New York City  
 Whitford, N. E. New York City Young, C. G. New York City  
 Whitney, G. C. New York City Young, H. A. Maplewood, N. J.  
 Whitson, A. U. Flushing, N. Y.  
 Whittier, T. T. New York City Zook, M. A. Washington, D. C.

### SOCIETY ITEMS OF INTEREST

**Report of the Committee on Special Committees Presented to the  
Board of Direction, January 15th, 1917, and Ordered  
Printed for the Information of Members**

NEW YORK, January 13, 1917.

THE BOARD OF DIRECTION,  
AMERICAN SOCIETY OF CIVIL ENGINEERS,  
220 West 57th Street,  
New York.

GENTLEMEN.—The undersigned, your Committee on Special Committees, beg to report as to their work during the past year.

At the meeting of your Board on April 18th, 1916, this Committee was "charged with overseeing all of the work of Special Committees and the approval of all expenditures of such Committees".

We have been advised of the work of these Special Committees after their reports have been published in the *Proceedings*. We believe that the only way in which this Committee can be of any real use or service to your Board is by being furnished information on the work and expenses of all Special Committees when such information is rendered to the Society.

During the past year we regret the loss by death of one of our members, Mr. Bogue, whose vacancy has not yet been filled.

We have ascertained various information by correspondence with the several Special Committees, which we herewith beg to state, with our comments and recommendations.

*1.—On Concrete and Reinforced Concrete.*

This Committee has tendered a final report, which is printed in the December *Proceedings*. This report is voluminous, and a highly valuable contribution to the records of the Society, and the Special Committee is to be congratulated on its work.

At the April 18th meeting your Board appropriated \$675.00 for the work of this Committee during 1916. There has been actually expended of this amount \$451.60, for mileage exclusively. Contributions to the work of this Committee have been made by the American Society for Testing Materials, the American Railway Engineering Association, and the Portland Cement Association. The Committee has had very heavy expenses for printing, duplicating typewriting, mailing, etc., and requires an amount of \$317.83 to pay up outstanding indebtedness. We have further received from Mr. Worcester a more intelligible explanation as to the payment of salary to the Secretary of the Committee, which was declined at the April meeting of your Board. It now appears that this was improperly done several years ago, and that



the Committee then entered into written agreement to pay this salary, which was in lieu of hiring outside clerical assistance. The individual members of this Joint Committee have personally contributed to liquidate these obligations and are still short about \$700.

In view of the conclusion of the work of this Special Committee, and having in mind the admirable Final Report submitted, we recommend that appropriation be made of \$500, on account of this item of deficit of the Committee, making a total appropriation for the work and expenses of this Committee of \$817.83.

This Committee desires to maintain its organization for sufficient time during this year to deal with answers to such discussion as the publication of its report may develop, and thereafter to be discharged. We further recommend the appropriation by the incoming Board of Direction of such amount for mileage of members as may be necessary for any meeting of this Special Committee called to consider any discussion of its report.

#### 2.—*On Engineering Education.*

Your Board appropriated for 1916 expenditures the sum of \$100. No part of this has been expended, and Mr. FitzGerald reports that no appropriation is required for 1917. He can submit no report, but only a brief statement of progress, but he hopes to have present, at the Annual Meeting, Dr. Mann, of Carnegie Foundation, to say a few words on the present aspect of investigations now in progress.

#### 3.—*On Steel Columns and Struts.*

Your Board appropriated for 1916 expenditures the sum of \$980, and ordered \$100 of such expenses as were incurred to be paid out of the special fund contributed by Bethlehem Steel Company. There has been actually expended \$481.65. The Chairman, Mr. Pegram, is unable to make up a budget for 1917 expenditures until ten days after the Annual Meeting. A progress report has been published in December *Proceedings*, and Mr. Pegram advises that the final report is not ready; that the Committee is now engaged on some special work, and that no change in the personnel of the Committee is desired.

In the absence of a budget for 1917, we are unable to make any recommendation as to an appropriation.

#### 4.—*On Materials for Road Construction.*

Your Board appropriated for 1916 expenditures the sum of \$500, of which amount there has been expended \$235.53.

A progress report of this Committee has been published in December *Proceedings*, and Mr. Crosby advises that he anticipates a final report will be made at the Annual Meeting in January, 1918. The Committee as now constituted is working harmoniously and actively. It is antici-

pated that the work of preparation of the final report during the next year will involve greater expenditures than heretofore, and Mr. Crosby asks for an appropriation of \$800. While we do not consider that this large sum should be, or will be, expended, we recommend that in view of the importance of the subject, the Board should appropriate for 1917, for the conclusion of the work of a final report, the amount asked, \$800.

No change is desired in the personnel of this Special Committee.

5.—*On Valuation of Public Utilities.*

Your Board appropriated for 1916 expenditures the sum of \$600, of which amount there has been expended \$526.28.

This Committee has published in the December *Proceedings* its final report, which is a voluminous and valuable contribution to the bibliography of the subject. The Committee is to be heartily congratulated on the promptitude and energy displayed in the presentation of its final report, which gains in value by its presentation at this time.

The Chairman, Mr. Stearns, desires to maintain the organization of this Committee, as now constituted, a sufficient time after the Annual Meeting to formulate its reply to any discussion which might be brought forth, and thereafter to be discharged. For the mileage and expenses of such meetings as may be needed for this purpose, an appropriation of \$250 is asked, which we recommend for the consideration of the incoming Board.

6.—*To Investigate Conditions of Employment of, and Compensation of, Civil Engineers.*

Your Board appropriated for the 1916 expenditures the sum of \$438.40, of which sum there has been expended only \$144.72.

The final report of this Committee is published in the December *Proceedings*, and the Chairman, Mr. Lewis, requests the discharge of the Committee, which we beg to recommend, with thanks to the members of the Committee for the service rendered.

7.—*To Codify Present Practice on the Bearing Value of Soils for Foundations.*

Your Board appropriated for 1916 expenditures the sum of \$1 200, of which amount, we understand, there has been expended \$240.75. All matters relating to the work of this Committee were taken out of our hands by reference to Messrs. Jonah, Wilkins, and Sprague, whose report, dated September 30th, 1916, covers all matters relative to the work of this Committee. We recommend, therefore, that appropriation be continued as recommended by Mr. Jonah's report, of the balance remaining of the \$1 200 last appropriated, or \$959.25.

Mr. Cummings proposes to submit to the Annual Meeting a progress report of what work has been done during the past year by the U. S.

Bureau of Standards and the Technological Branch of Carnegie Library. We understand Mr. Cummings desires to reorganize the personnel of this Committee, and, in case he furnishes us with his views, we shall submit same to your Board.

8.—*On a National Water Law.*

Your Board appropriated for 1916 expenditures the sum of \$500, of which amount only \$49.82 has been expended. During the past year this Committee has been reorganized. The Chairman, Professor Newell, has made a progress report which is published in December *Proceedings*, on the general scope of the work, and he desires to continue the Committee as now constituted.

We have had a conference with Professor Newell, and find that he has definite views on the enlargement of the scope and field of investigation of the work of his Committee, to cover sources of water, pollution of water supply, irrigation, and other uses of water, in addition to its use for power development. We, therefore, have suggested to Professor Newell that, in view of our opinion that it is no function of an engineering society to prepare water laws, either State or Federal, and that the whole question of legislation and preparation of laws can better be dealt with by other professional organizations, the present title of this Committee is a misnomer, and the Committee should be re-christened. Professor Newell heartily agrees to this and suggests that the title should be "Special Committee on Conservancy". We do not feel that this title is the best available, and suggest "Special Committee on the Regulation of Water Rights".

We recommend in any case that the title and scope of work of this Committee be changed and that appropriation for 1917 be made in the sum of \$450.

9.—*On Floods and Flood Prevention.*

This Committee was discharged by your Board at the Pittsburgh meeting on June 22d. Strenuous opposition to this action has been made by Mr. Morris Knowles, one of the members, on the ground that the Annual Meeting of 1916 continued the life of this Committee, and that the Board had no power to discharge it. There is no desire on the part of Mr. Knowles to continue the Committee, and, therefore, we have agreed to make formal motion to the Annual Meeting for its discharge.

10.—*On Stresses in Railroad Track.*

No appropriation was specifically made by your Board for this Committee, and the expenses are now being paid out of the special fund set

up for its work. This Joint Committee has expended in 1916 the sum of \$1 946.09.

It is proposed to make a progress report to the Annual Meeting.

Work by this Committee is proceeding actively, and with interest and energy on the part of its members. The same personnel should be continued. Experimental work has been carried on with specially designed apparatus for track and ballast tests, for the most part on the Illinois Central and Lackawanna Railroads.

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For the work of all Special Committees for 1916 your Board appropriated a total sum of \$5 000, and we beg to report that the expenditures have been \$4 115.07, or a saving from the appropriation of \$884.93.

We cannot too strongly emphasize the importance of the work of Special Committees to the Society. At the same time, to be of greater value to the Society, the work of each Special Committee should be pushed strenuously and results reported at as early a date as possible.

At this Annual Meeting there will be concluded the Special Committees on—

Floods and Flood Prevention;  
Concrete and Reinforced Concrete;  
Valuation of Public Utilities;  
Employment and Compensation of Engineers.

This will reduce materially the burden and expense of maintaining Special Committees.

At the meeting of your Board on April 18th, ulto., this Committee was appointed as a Permanent Committee of the Board and we, therefore, recommend for our successors that in the event that other Special Committees of the Society may hereafter be asked for or considered, that the most careful scrutiny should be given, before appointment, as to their value, scope, and purpose, particularly in respect of the work being directed strictly within engineering fields.

We further recommend that the rules relating to the appointment and government of Special Committees should be so amended as to make this Committee of your Board the intermediary on all matters between the Special Committees and the Board of Direction.

In regard to the future regulation of Special Committees, we call the attention of the Board to the recommendations contained in the letter from the President to the Chairman of our Committee, of November 24th, 1916, printed copies of which have been sent to the present and incoming members of the Board.\*

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\* This letter will be found on page 129.

Finally, Mr. Davies and Mr. Bush respectfully beg to tender their resignations as members of this Committee of the Board.

Respectfully submitted,

J. V. DAVIES

*Chairman.*

L. BUSH

CLEMENS HERSCHEL

*(Ex officio)*

**Letter from President Herschel to the Committee on Special  
Committees Referred to in the Report  
of that Committee.**

Mr. J. VIPOND DAVIES,

Chairman of the Committee on Special Committees, Board of  
Direction,

American Society of Civil Engineers, 30 Church Street,  
New York City.

DEAR SIR:

With a full appreciation of the service which your Committee has already rendered in the best interests of our Society, I address you as Chairman of an important Committee, and speaking as a member of that Committee. You will recall that the Board of Direction at its meeting at Pittsburgh in June, 1916, declared that the President of the Society was under the Constitution *ex officio* a member of all Committees appointed by the Society.

It was felt that the work of Special Committees appointed by the Society had assumed a development and cost to the Society, which necessitated some active connecting link between them and the Board of Direction, if government or co-ordination of service to the Society there should be, and the vote that was passed, looked to that end.

Since then I have been informed of prospective meetings of the Special Committees, hitherto unknown in advance to any one except to the individual members of each Committee, have attended three such meetings, and am impressed with the importance of your Committee and its work, preventive as well as remedial, to the future welfare of the Society; so much so, that I urge you to move for the formation of your Committee into a permanent Standing Committee of the Society.

More than this: and going back to original causes, I think that the method of appointment of these Special Committees is something that calls for reform. The Constitution prescribes two methods for such appointment, one of which has been found too cumbersome for use in actual practice, so that Special Committees are as a rule now appointed by the Board of Direction on petition; and in the revised



Constitution now under discussion, Art. VI, Sec. 10, in one draft has read: "Special Committees may from time to time be appointed by the Board of Direction from the membership of the Society, to report upon engineering subjects." It has seemed to me that when the question comes up whether or no to have a Special Committee on any subject, it should always first form the subject of serious consideration by your Committee, and before discussion upon it is had in the Board of Direction; and as for passing on such matters at the Annual Convention or Annual Meeting of the Society, I think every one will agree that with the proportions the Society and these meetings have attained and the limited time that is available, these meetings have practically ceased to be deliberative assemblies, and cannot wisely act, in matters such as have been referred to.

But these Special Committees once appointed, go on and on, exhaust the resources and energies of the Society which might be put to better uses, and in this way balk the action of the Society in more useful channels, and automatically cause it great expense; or else are or may be checked only by the brutal method of refusing them the desired appropriations for carrying on their work as its members zealously wish to carry it on.

These Committees have not in their charge the interests, perhaps not even the renown of the whole Society, and cannot be asked to safeguard them; your Committee should do this by co-operation with them, and may be enabled to do it in the future, by the fact that the President of the Society is a member of all Committees.

You have hitherto discussed the work of several such Committees, and I propose to illustrate what has above been said, by the present situation of the Society with respect to another such Special Committee.

January 18th, 1911, at a meeting of the Society and on motion of Charles Hansel, M. Am. Soc. C. E., the appointment of a "Valuation Committee" was referred to the Board of Direction. This, it will be noticed was long before the Congress of the United States undertook to value all the railroads of the country.

At the Annual Meeting of January 15th, 1913, a "Progress Report" was presented by its Chairman, Frederic P. Stearns, Past-President, Am. Soc. C. E.

At the Annual Meeting of January 21st, 1914, a "Progress Report", published only in pamphlet form, 112 pages, was presented by title.

At this meeting it was also moved and carried that the Progress Report should not be printed in the *Proceedings* of the Society, until it was in final form.

On March 11th, 1914, and April 2d, 1914, afternoon and evening, Special Meetings of the Society were held for discussion of the pamphlet form of the Progress Report. See *Proceedings* for February, March, April, May, August, and October, 1914—343 pages—besides

other articles on the same subject, and a bibliography ordered by the Committee, 60 pages, printed in *Transactions*, Vol. LXXXVI, brought up to July 16th, 1913.

Issuance of further copies of the pamphlet Progress Report was stopped by the Board of Direction in October, 1914.

There is now set up in galley form, over 300 standard pages of the report of the Committee, automatically and otherwise pressing to be published in the *Proceedings* of the Society. To this is to be added the discussion to be had on the subject.

This subject of Valuations is one in which I have had some experience, and I speak as the result of that experience, and of study. Let one say what one may, in the final analysis a valuation is a matter of opinion—if one pleases, of a trained judgment—not of computation. And this has been recognized by every one having to do with the subject, from the Supreme Court of the United States, down to the beginner in that kind of work. And yet, we have learned discussions on mere twigs of branches of the limbs of the trunk or tree of *computing* any one kind of a valuation report, whose influence upon the proper final result is of about the potency of the famed millionth dilution of a drug in the pharmacopœia, upon the human system.

Says the Supreme Court of the United States, in speaking of the determination of the fair value of a property for rate making: "And in order to ascertain that value, (1.) the original cost of construction, (2.) the amount expended in permanent improvements, (3.) the amount and market value of its bonds and stock, (4.) the present as compared with the original cost of construction, (5.) the probable earning capacity of the property under particular rates prescribed by statute, and (6.) the sum required to meet operating expenses, are all matters for consideration, and are to be given such weight as may be just and right in each case." And yet the Court adds that it does not say "that there may not be other matters to be regarded in estimating the value of the property".

In other words, the Supreme Court has said, that a valuation is not a matter of computation, or of the use of a specially created jargon of words, or of the striving by a body of men to become wise from the study of each other's books, but an opinion, based on giving "such weight as may be just and right" to the elements that may be adduced in arguing values up or down.

It was my privilege accidentally to be present in the Halls of Congress when the Act under which the country is now paying not less than 50 millions of dollars for a valuation of the railroads of the United States was passed, and if there was any argument used in favor of the proposition, other than that of an expectancy of proving the railroads to have been over-capitalized, (which has so far not been proven with respect to the principal railroads of the country,

and there is no prospect in sight that this ever will be proven to any material extent), and of their robbing "the people", and that they must therefore be throttled and rates reduced, I did not hear it. But the work is going on, and is in some state of forwardness. The Act calls for (1.) the original cost to date, (2.) the cost of reproduction new at a certain date (which cost will presumably not be ascertained until some 10 years after that date), and (3.) the cost (at the date named) of reproduction new, less depreciation; all of this for each road, and also chopped off between State lines. By the time this has been completed, if it ever shall be completed, it must all be brought up to the then date. Should this require say 5 years more time, then there would have to be a renewed bringing up to date; in fine, it is not unlikely that unless abolished, the Division of Valuation of the Interstate Commerce Commission may find itself in the position of the asymptote to a conic section: forever approaching, but never attaining finality.

The Commission is also required "to ascertain and report separately other values, and elements of value, if any, of the property of such common carrier, and an analysis of the methods of valuation employed, and of the reasons for any differences between any such values, and each of the foregoing (three) cost values".

This sort of thing has been going on now (1916) for over three years and here is the picture of one result achieved:

"VISIBLE INTEREST OF THE PUBLIC IS NEGLIGIBLE.

"The subject matter of the valuation proceedings involves a greater amount of property than has ever been before any civil tribunal for consideration. The results of the valuation are of immediate concern to every person who travels, every producer, shipper, and consumer. Yet the visible interest of the public is negligible.

"This was illustrated in the first conference held between the Division of Valuation and the representatives of the public and the carriers, at which any definite results were submitted for consideration. Physical valuation had been in everyone's mouth for years; the demand for an appraisal by federal authority had become so strong that Congress was compelled to recognize and concede it; three years had been spent in organization and investigation, at a cost aggregating several million dollars of public funds; the fundamental questions had been keenly and publicly debated before the Commission; and finally the Division of Valuation was submitting the result of its investigations in the first case to be completed. An informal conference was called, precedent to the transmissal of the work of the Division of the Commission with its recommendations. The carriers were represented in full force; attorneys, accountants, engineers, and executives crowded the conference so that it was difficult for those at the outer edge of the gathering to follow the proceedings. Men of eminence in their professions were brought across the continent merely to sit, look and listen. On the other part, the chief engineer and his assistant from

the interested state commission, and the representative of the Valuation Committee of the National Association of Railway Commissioners, comprised the sole representation from the public standpoint. Neither this conference nor any of the series which followed it were noticed in the news columns of the daily press to the extent of a single syllable."

No wonder the writer, a former railroad Commissioner (I am another, come to think of it), closes his article by saying:

"Whether the federal appraisal will prove to be a public benefit or a public calamity remains to be seen. \* \* \*

"The public indifference to the work, and the possible general misunderstanding of the results and their misapplication to purposes never contemplated, threaten grave public danger."

Yet are pounds of literature issued and being issued by the Division of Valuation, Interstate Commerce Commission, and by its victim, upon which it has been turned loose by the Congress of the Nation,—the "Presidents' Conference Committee", representing most of the railroads of the United States; and the end is not in sight.

More than this: it will be observed that the work of the Commission extends deeply into the past, like all of this valuation work of the day, (even to the extent of making wash-borings through old embankments over marsh areas, to find the location of the bottom they stand on); is greatly concerned about the present; but cares little for the future. Yet what man so stupid that when he buys anything, will not chiefly concern himself with its future usefulness; or future earning capacity?

And going further, is there any one who will argue that the future also may be made in an overruling manner the subject of schedules, of depreciation theories, bookkeeping, and of arithmetical computations?

Canada has taken up the task of valuing its railroads incidental to a government enquiry on a kindred subject, and the matter has been placed in the hands of our fellow member, George F. Swain, Past-President of the Society. If I am correctly informed, a time limit of some 6 months or less has been set for making this valuation, and who will argue, that on a matter of trained judgment or opinion like this, 6 months time of an able examiner may not produce as reliable and valuable results as legal processes, and a time reaching into the never, never future, as in the case of the Interstate Commerce Commission valuation, and as above explained?

Now into such an examination, wrangle, and contest, not to mention shelf loads of bound volumes, similar reports from similar Committees of other Societies, and cart loads of technical press articles on the same subject, our Special Committee proposes to inject its report; and also into our *Transactions*, and following the usual understanding,

this Report is to pose as the consensus of opinion of the American Society of Civil Engineers on the subject matter. It is not to be supposed for an instant that our members in general will agree to the definitions or arguments presented, or that another Special Committee appointed on the same subject, would present the same or necessarily even the same kind of a report. Wherefore, it should by rights be called the report of a Special Committee, rather than that of the Special Committee of the Society; and it should be made plain to everybody that agreement and the settlement of principles on such a subject is not to be expected in our Society, or out of it. Least of all by those directly concerned. Is it to be expected that the Interstate Commerce Commission will, to any material extent, look to the report here referred to, as establishing principles on such a subject? Or must not rather all evaluators hereafter be guided by the authority of that great official exemplar on this subject? Will the valuation of the railroads of Canada be affected by it? What is supposed to be the use of such a report?

It contains, to be sure, the potency of much work by means of argument; indoor work, consisting of rhetoric, bookkeeping, philosophy, and the flow of the dictaphone or typewriter, for engineers and others, but does it inure to the benefit of the art of engineering; to the "advancement of engineering knowledge and practice, and the maintenance of a high professional standard among engineers", in the language of our Constitution?

Is civil engineering now, and is it further to develop as a *constructive* art; or is it to be a compound of politics, political economy, generally tinged with socialism, and the work of the chartered accountant, overlain by that of the wrangling lawyer; all of which is, by comparison, only as parasites on the body politic?

The way the Society values reports on such a subject as this of valuations, will go far to give the answer to the question just stated. For my own part, I will submit that the Report before us should not go into the *Transactions* of the Society.

It may perhaps be said that this is a decision to be taken by the Society or by the Board of Direction, through its Committee on Publications, rather than by the Committee of which you are Chairman, but I am saying this here for the sake of writing one letter instead of two.

The Special Committee on Valuations has done long, proficient, and diligent work, but, in my opinion, this has been done in an unworthy cause; unworthy of its individual members, of the Society, and of the Profession whose fair name and purpose we should all

\* *Electrical World* of Nov. 18, 1916, p. 1021, has this to say: "Recommendations will be submitted by the Interstate Commission to Congress when it reconvenes which will outline for the guidance of state regulatory bodies the manner in which they should ascertain the fair valuation of utility companies."



cherish; which the Special Committee should cherish above that even of pride in their immediate and especial work.

I learn that the cost to the Society of the Special Committee on Valuation, mainly for expenses of the Committee and printing, now in sight, will amount to about \$6 000, and I greatly mistake the temper of our membership should I suppose them as thinking that that amount of money or anything like it, will have been well spent, for work such as this,—only, still another contribution to the discussion of a forever debatable subject, which comes barely within the domain of what may be called civil engineering.

I have discussed the work of this one Special Committee as an illustration to my argument for greater care and discrimination in the appointment of all such committees, and as a motion for the consideration of the question whether this Report should issue in the *Transactions* of the Society, under the seal and commendation, tacit or expressed, of the American Society of Civil Engineers.

CLEMENS HERSCHEL,

Member, *ex officio*, of the  
Committee on Special Committees.

NEW YORK, N. Y.,

Nov. 24, 1916.

**Telegram from the Presidents of the  
National Engineering Societies  
And the United Engineering Society  
To the President of the United States**

The following telegram from the Presidents of the National Engineering Societies and of the United Engineering Society was sent to the President of the United States on February 6th, 1917:

"TO THE PRESIDENT, EXECUTIVE MANSION, WASHINGTON, D. C.

"We, the Presidents of the National Societies of Civil, Mining, Mechanical, and Electrical Engineers, and of the United Engineering Society, with a membership of thirty thousand, cordially unite in supporting Congress and the administration in the stand for freedom and safety on the seas, and we are confident that we represent the membership of the four societies in offering to assist toward the organization of engineers for service to our Country in case of War.

"GEORGE H. PEGRAM, President,  
American Society of Civil Engineers,

"L. D. RICKETTS, President,  
American Institute of Mining Engineers,

"IRA N. HOLLIS, President,  
American Society of Mechanical Engineers,

"H. W. BUCK, President,  
American Institute of Electrical Engineers,

"CHAS. F. RAND, President,  
United Engineering Society."

**Technical and Non-Technical Committees  
Of the Colorado Association of  
Members of the American Society of Civil Engineers**

At the meeting of the Colorado Association of Members of the American Society of Civil Engineers on December 9th, 1916, a plan was presented for establishing certain committees through which technical and non-technical matters might receive closer attention by the Association.

It was planned to appoint a number of technical committees which would review the papers published in the *Proceedings* and submit abstracts thereof before the regular meetings of the Association. The designations of these committees are to accord with a classification of engineering subjects, and the duty of each is to review and abstract the papers within the scope of its subject or sub-divisions thereof. In conformity with this idea, committees on the following general subjects have been named: Concrete, Conservation, Dams, Foundations, Irrigation, Municipal, Power, Railroads, Roads and Highways, Structural, Surveying, and Valuation.

Each committee consists of a chairman and two members. The chairman of each committee will examine each issue of *Proceedings*, and assign to himself or some member of his committee the duty of reviewing the paper and preparing a brief abstract of it for presentation. The committees are not to be confined to the *Proceedings* as a source of technical data for presentation, but may obtain such data from any other source. Matters which may be presented to the Association for discussion at any time may be referred to the Committee on that subject for investigation and report.

When a committee or a member thereof has prepared an abstract of a paper, or has a report of any nature ready for presentation, he shall notify the Secretary of the Association, who, after conference with the Executive Committee, will assign the meeting at which the information may be presented. It is not intended that every meeting be devoted to the discussion of technical subjects, but that probably alternate meetings will be given over to such discussions, and several subjects may be assigned to one meeting, the intervening meetings being for addresses and other business as heretofore.

Non-technical committees are to be appointed in order that certain affairs of the Association may have more detailed attention and expert advice. Publicity, Co-operation, and Legislative Committees have been suggested, and others are needed but cannot be appointed at present because of the fact that the parent Society has under discussion matters pertaining to their duties.

At each regular meeting of the Association the President will appoint three members to act with the Executive Committee in preparing for the succeeding meeting. Committees to provide entertainment for any special meetings may be appointed at any time.

**The Alfred Noble Memorial \***

At the meeting of the Board of Direction of this Society, held on June 2d, 1914, a tribute by the Engineering Profession to the life and memory of Alfred Noble, Past-President, Am. Soc. C. E., was unanimously adopted and spread upon the minutes. The Board, at the same time, thought it proper and desirable to recognize the worth of the man in a more substantial way by erecting a memorial to him. This was first brought to the attention of the members of the Society by the Secretary's circular dated July 1st, 1914.

It was decided that, as Alfred Noble's professional practice had been National in character, and as he had been an adviser of the President and other officials of the Government, and had been consulted on some of the most important engineering work of the country, the Capital of the Nation was the proper location for such a memorial. The Board set aside \$1 000 as a first subscription toward the necessary funds, and appointed the following committee, with power to carry out the project:

ONWARD BATES, *Chairman*, Chicago, Ill.

ROBERT MOORE, St. Louis, Mo.

SAMUEL REA, Philadelphia, Pa.

SAMUEL H. HEDGES, Seattle, Wash.

F. H. NEWELL, Washington, D. C.

W. W. HARTS, Washington, D. C.

CHARLES WARREN HUNT, *Secretary*, New York City.

As more than two and a half years have elapsed since the appointment of the Committee and no definite report has been possible, it is believed that a general statement of what has been accomplished to date would be of interest. This is in no sense a report of the Committee.

Following the procedure in such cases, as recommended by the National Commission of Fine Arts, the Committee first engaged a competent architect to advise as to the best site for the memorial in the City of Washington, and the best memorial treatment of that site.

The architect selected was Mr. Glenn Brown, of Washington, and, after a study of the problem, he advised the selection of Rawlins Park, adjoining the building of the Department of the Interior on the south, as a suitable site for a memorial to an eminent engineer, as that department contains several of the important engineering branches of the Government. He recommended, further, that the important streets interrupted by the Park and the Interior Department Building should be recognized in placing the memorial and in the planting and the walks of the park. Therefore he advised carrying the line of New

\* Statement made by Charles Warren Hunt at the Meeting of the Society, February 7th, 1917.

York Avenue through the park, not as a street, but as an open view, with trees planted far enough apart to prevent the obstruction of this view in the future, and with the grass, plants, and walks on this axis connecting the park with the system of city streets and also giving the most direct line for foot traffic.

He also proposed to connect the design with the Departmental Building by confining the center of the park, leading up to the memorial, to low, rather formal planting, following the lines of the central portion of the building, thus giving an open view by their future growth. An almost complete planting of the park is recommended.

Mr. Brown advised that the character of the memorial take the form of a fountain, with large-scale architectural features and forceful symbolic figures.

On receipt of this report the Committee held a meeting in Washington, and, after inspecting the site recommended, accepted it. Before formal adoption of these recommendations by the Committee, the National Commission of Fine Arts had, as a matter of courtesy, reviewed the recommendations of the expert adviser, as to the location and general scheme, and found them acceptable as promising the best artistic results.

The selection of a sculptor was then considered. The Committee inspected photographs of the works of many sculptors, and some executed works. Mr. Paul Bartlett was selected, and the commission was offered to him. He accepted, and chose as his architectural collaborators Messrs. Glenn Brown and Bedford Brown.

The sculptor and the architects at once commenced their study of the design for the fountain and the treatment of the park.

In describing the result of their efforts, they say:

"The center of the square, after thorough study, was considered the best location. The planting suggested for the memorial shows an open court facing the central portion of the new Interior Department Building, giving the most imposing view from this point, and binding it in with this Department in which the principal engineering branches of the Government are housed. The diagonal lines direct for traffic are kept open, giving a diagonal view of the memorial, the second most imposing view. The oblong character of the fountain was adopted because it seemed to fit most logically with the form of the square. It was determined that it should be made low and massive as befitting the solidity and permanence of engineering work. After studying and discarding many compositions based on the above ideas, the models shown here have been selected as combining best the features desired—a fountain befitting the site, and a memorial to an eminent engineer, symbolizing by its form and sculpture the character of the man and his life.

"The dominant architectural element is the large elliptical bowl, set on a solid base and flanked by the dominant sculptural element, two strong seated figures. The memorial will rise from a large basin

of water, 37 feet wide and 63 feet long, surrounded by a wide stone coping, indicating the form of the composition, making it a part of the memorial, and for this reason dominating the water surface."

The sculptural figures are intended to show the strong elements in Alfred Noble's character—thought in preparation, force in execution. Each figure will hold a scroll on which will be carved an example of the work by which Alfred Noble is so well known. On the coping beneath the figures there will be descriptive lettering. Directly below the name on the base there will be a large cartouche on which there will be a relief portrait.

The display as a fountain will be imposing and attractive. The water will rise in a large mass, falling into and overflowing from the small bowl into the large oval one. From the latter it will fall into the great basin at the ground level. Water jets will flow into the large basin from the dolphins on the base.

The memorial will be of green granite, for both the sculptural and architectural features, harmony in color being secured by different methods of tooling.

The memorial as planned will cost \$45 000. The United States Government, at its own expense, has undertaken the development of the park. It is believed that the design, when executed, will be dignified and beautiful, and an object of pride to the Profession. It has met with the approval of the National Fine Arts Commission, under whose jurisdiction the decision as to the artistic character of memorials in the City of Washington has been placed by law, which also insures a work of art of the first order.

On May 8th, 1916, through the efforts of the Committee, Congress granted permission for the erection of this memorial by the Society, provided the work be done within three years.



### ANNOUNCEMENTS

The House of the Society is open from 9 A. M. to 10 P. M., every day, except Sundays, Fourth of July, Thanksgiving Day, and Christmas Day.

### FUTURE MEETINGS

**March 7th, 1917.—8.30 P. M.**—A regular business meeting will be held, and a paper by Charles W. Staniford, M. Am. Soc. C. E., entitled "Unusual Cofferdam for 1000-Foot Pier, New York City", will be presented for discussion.

This paper is printed in this number of *Proceedings*.

**March 21st, 1917.—8.30 P. M.**—At this meeting a paper by F. W. Scheidenhelm, M. Am. Soc. C. E., entitled "The Reconstruction of the Stony River Dam", will be presented for discussion.

This paper is printed in this number of *Proceedings*.

### SEARCHES IN THE LIBRARY

In January, 1902, the Secretary was authorized to make searches in the Library, upon request, and to charge therefor the actual cost to the Society for the extra work required. Since that time many searches have been made, and bibliographies and other information on special subjects furnished.

The resulting satisfaction, to the members who have made use of the resources of the Society in this manner, has been expressed frequently, and leaves little doubt that if it were generally known to the membership that such work would be undertaken, many would avail themselves of it.

The cost is trifling compared with the value of the time of an engineer who looks up such matters himself, and the work can be performed quite as well, and much more quickly, by persons familiar with the Library.

In asking that such work be undertaken, members should specify clearly the subject to be covered, and whether references to general books only are desired, or whether a complete bibliography, involving search through periodical literature, is desired.

It sometimes happens that references are found which are not readily accessible to the person for whom the search is made. In that case the material may be reproduced by photography, and this can be done for members at the cost of the work to the Society, which is small. This method is particularly useful when there are drawings or figures in the text, which would be very expensive to reproduce by hand.

A list of 989 bibliographies made in the Library, giving the cost of each, was published in Vol. LXXX of *Transactions*.

The foregoing notice, with the exception of the last paragraph, is reproduced from the 1916 Year Book.

Since October 1st, 1916, the Library of the American Society of Civil Engineers has ceased to exist, as such, having been merged with the Libraries of the Mining, Mechanical, and Electrical Engineers, and become a part of the Library of the United Engineering Society. There were 67 000 accessions, which were not duplicates, turned over to that Library.

**Hereafter, therefore, requests for searches should be addressed to the Librarian, United Engineering Society, 29 West 39th Street, New York City.**

### PAPERS AND DISCUSSIONS

Members and others who take part in the oral discussions of the papers presented are urged to revise their remarks promptly. Written communications from those who cannot attend the meetings should be sent in at the earliest possible date after the issue of a paper in *Proceedings*.

All papers accepted by the Publication Committee are classified by the Committee with respect to their availability for discussion at meetings.

Papers which, from their general nature, appear to be of a character suitable for oral discussion, will be published as heretofore in *Proceedings*, and set down for presentation to a future meeting of the Society, and on these, oral discussions, as well as written communications, will be solicited.

All papers which do not come under this heading, that is to say, those which, from their mathematical or technical nature, in the opinion of the Committee, are not adapted to oral discussion, will not be scheduled for presentation to any meeting. Such papers will be published in *Proceedings* in the same manner as those which are to be presented at meetings, but written discussions only will be requested for subsequent publication in *Proceedings* and with the paper in the volumes of *Transactions*.

The Board of Direction has adopted rules for the preparation and presentation of papers, which will be found on page 429 of the August, 1913, *Proceedings*.

### LOCAL ASSOCIATIONS OF MEMBERS OF THE AMERICAN SOCIETY OF CIVIL ENGINEERS

#### San Francisco Association, Organized 1905.

President, J. D. Galloway; Secretary-Treasurer, E. T. Thurston, 57 Post Street, San Francisco, Cal.

The San Francisco Association of Members of the American Society of Civil Engineers holds regular bi-monthly meetings, with banquet, and weekly informal luncheons. The former are held at 6 P. M., at the

Palace Hotel, on the third Tuesday of February, April, June, August, October, and December, the last being the Annual Meeting of the Association.

Informal luncheons are held at 12.30 P. M., every Wednesday, and the place of meeting may be ascertained by communicating with the Secretary.

The by-laws of the Association provide for the extension of hospitality to any member of the Society who may be temporarily in San Francisco, and any such member will be gladly welcomed as a guest.

(Abstract of Minutes of Meeting)

**December 19th, 1916.**—The Twelfth Annual Meeting was called to order at the Palace Hotel; President Haehl in the chair; E. T. Thurston, Secretary; and present, also, 88 members and guests.

The Secretary read a communication from Mr. Luther Wagoner, now Chief Engineer for the sewer and paving contracts of Havana, Cuba, referring to some features of his present environment, and presenting to the Association a large photograph of a typical Cuban tobacco plantation at San Cristobal. The Secretary offered a brief history of the Havana contracts.

The Secretary was directed to have the photograph framed, and presented to the Engineers' Club, with the compliments of the Association.

A communication from Mr. Fred. H. Tibbetts, suggesting that the Association undertake to express some opinion on the propriety of contingent engineering fees, was read and referred to the Board of Directors for report at the February meeting.

The report of the Secretary showed that six regular meetings had been held during the year, at which the average attendance had been 63, and that there had been one special meeting for the purpose of discussing proposed amendments to the Constitution of the parent Society, attended by about 30 members. There had also been a dinner in honor of Secretary Charles Warren Hunt, an excursion of some 30 members on June 22d to inspect the construction of the Twin-Peaks Tunnel and Ocean Esplanade and Sea Wall, San Francisco, and an excursion of 57 members and guests, on October 31st, to inspect the construction of Calaveras Dam of the Spring Valley Water Company. The regular weekly luncheons had been held in both Oakland and San Francisco.

The total additions to the membership of the Association have been 17 and the losses 7, leaving a total membership of 195. Of the membership of the Society resident within the district surrounding San Francisco Bay, the Association has 72% of the Members, 50% of the Associate Members, 75% of the Associates, and 28% of the Juniors.

The year's work of the Association has been distinguished by very active committee work having to do with the public welfare and the general good of the Engineering Profession.

The Treasurer's report showed total receipts of \$952.11, disbursements of \$853.09, and a total treasury balance of \$3 852.77.

Mr. Jerome Newman, for the Committee on Civil Service, reported progress.

Mr. J. D. Galloway, for the Committee on Military Preparedness, reported securing the co-operation of the local branch of the Army and an offer of the assistance of five local army officers in conducting a course of study to prepare for examinations for entrance to the Officers Reserve Corps.

Professor Charles D. Marx, for the Committee appointed to investigate and report on the removal of Mr. Frickstad from a Civil Service position in Oakland, reported progress.

Mr. E. T. Thurston, for the Committee on Building Construction Safety Orders, reported that the first meeting of the committee was set for the coming week.

The Secretary announced that the proposed amendments to the Constitution of the Association, consolidating the offices of Secretary and Treasurer, reducing the number of Directors to five, and changing the date of the Annual Meeting to the third Tuesday of December, had carried.

The following officers for the ensuing year were elected: President, J. D. Galloway; Vice-President, H. J. Brunnier; Secretary-Treasurer, E. T. Thurston.

The meeting was entertained with two reels of moving pictures.

Messrs. Hawley, Clark, and Whitney were appointed as the Entertainment Committee for the February Meeting.

The address of the evening, delivered by Mr. J. W. Swarin, consisted of a general talk on the personal side of engineering work, especially in foreign countries, and was illustrated with lantern slides.

Adjourned.

#### **Colorado Association, Organized 1908.**

President, Thomas W. Jaycox; Secretary-Treasurer, L. R. Hinman, 1400 West Colfax Avenue, Denver, Colo.

The meetings of the Colorado Association of Members of the American Society of Civil Engineers (Denver, Colo.) are held on the second Saturday of each month, except July and August. The hour and place of meeting are not fixed, but this information will be furnished on application to the Secretary. The meetings are usually preceded by an informal dinner. Members of the American Society of Civil Engineers will be welcomed at these meetings.

Weekly luncheons are held on Wednesdays at 12.30 p. m., at Daniel's and Fisher's.

Visiting members are urged to attend the meetings and luncheons.

#### **(Abstract of Minutes of Meeting)**

**December 9th, 1916.**—The meeting was called to order at the Denver Athletic Club; President Jaycox in the chair; L. R. Hinman, Secretary; and present, also, 15 members and guests.

The minutes of the previous meeting were read and approved.

The Secretary read a letter from Mr. Roger W. Toll stating that he had resigned from the American Society of Civil Engineers and thereby forfeited his membership in the Colorado Association. The Secretary was instructed to inform Mr. Toll of the regret of the Association in losing him as a member, and urge him still to attend the meetings and luncheons.

The Secretary announced a deficit of \$8 in the entertainment fund at the close of the year. It was ordered that this sum be transferred from the general fund.

The President placed before the Association a plan for the review of papers published in the *Proceedings*, by placing abstracts of these papers before the regular meetings by committees appointed to accord with a classification of engineering subjects, each committee to review any published papers within the scope of its subject or subdivisions thereof. The President was authorized to make a classification and appoint committees, each to consist of a chairman and two members, to abstract papers published in the *Proceedings* and present such abstracts at meetings designated by the Executive Committee.

In connection with non-technical committees which would also be appointed, the President raised the question of an employment bureau, in connection with the Association. Pending receipt of information from a committee of the Parent Society now investigating this subject, the matter was dropped.

The Committee appointed to confer with Governor Gunter, in the matter of the appointment of an engineer to fill the vacancy in the membership of the State Public Utilities Commission, reported progress.

Adjourned.

#### **Atlanta Association, Organized 1912.**

President, Paul H. Norcross; Secretary-Treasurer, Thomas P. Branch, Georgia School of Technology, Atlanta, Ga.

The Association holds its meetings at the University Club, Atlanta, Ga. Regular monthly luncheon meetings are held to which visiting members of the Society are always welcome.

#### **Baltimore Association, Organized 1914.**

President, H. D. Bush; Secretary-Treasurer, Charles J. Tilden, The Johns Hopkins University, Baltimore, Md.

#### **Cleveland Association, Organized 1914.**

President, W. J. Watson; Secretary-Treasurer, George H. Tinker, Hickox Building, Cleveland, Ohio.

#### **(Abstract of Minutes of Meeting)**

**January 6th, 1917.**—The meeting was called to order; President Robert Hoffmann in the chair; George H. Tinker, Secretary; and present, also, 22 members.

The following officers were elected for 1917: President, W. J. Watson; Vice-President, Harry Fuller; and Secretary-Treasurer, George H. Tinker.

The report of the Secretary-Treasurer for 1916 was read.

Mr. Robert Hoffmann, the Retiring President, summarized briefly the activities of the Association during the past year.

Mr. A. J. Himes called attention to the reports of the Special Committees of the Society, published in December, 1916, *Proceedings*,



and commended the work which the Society is doing through its Special Committees.

Adjourned.

**Detroit Association, Organized 1916.**

The regular meetings of the Association are held on the second Friday of December, April, and October, the last being the Annual Meeting.

**District of Columbia Association, Organized 1916.**

President, A. P. Davis; Secretary-Treasurer, John C. Hoyt, U. S. Geological Survey, Washington, D. C.

**Illinois Association, Organized 1916.**

President, Onward Bates; Secretary-Treasurer, E. N. Layfield, 4251 Vincennes Avenue, Chicago, Ill.

The regular meetings of the Association are held on the second Monday of March, June, September, and December, the last being the Annual Meeting. The hour and place of meeting are not fixed, but this information will be furnished on application to the Secretary.

**Louisiana Association, Organized 1914.**

President, W. B. Gregory; Secretary, Charles W. Okey, Tulane University, New Orleans, La.

The regular meetings of the Association are held at The Cabildo, New Orleans, La., on the first Monday of January, April, July, and October.

**Nebraska Association, Organized 1917.**

President, Frank T. Darrow; Secretary-Treasurer, Homer V. Knouse, 115 City Hall, Omaha, Nebr.

Regular meetings of the Association are held on the first Saturday of each month, except July and August, and at such places as may be appointed from time to time by the Executive Committee. The Annual Meeting is held in Lincoln, Nebr., on the second Friday in January.

It is probable that frequent luncheons will be held in Omaha, in addition to the monthly meetings, at which visiting members will be welcomed. The place of meeting may be ascertained by communicating with the Secretary.

(Abstract of Minutes of Meetings)

**January 5th, 1917.**—A meeting of members of the American Society of Civil Engineers was held at Lincoln, Nebr.; William Grant, temporary Chairman, Clark E. Mickey, temporary Secretary, and present, also, 12 members.

The Secretary read communications from several members and also a letter from Chas. Warren Hunt, Secretary of the Society.

The question of the establishment of the Nebraska Association was discussed.

Hon. C. W. Bryan, Mayor of Lincoln, addressed the meeting on the Relation of the Engineer to all Public Works and to the Public,

describing the public park system of Lincoln and welcoming the members to the city.

At the conclusion of the address the members were entertained at lunch by the Lincoln members at the Commercial Club. Following the luncheon, an automobile trip was made to Antelope Park, the Water and Light Station, the University of Nebraska, and other points of interest.

The meeting was again called to order at 3.50 P. M., with 7 additional members present.

A Constitution was adopted, for submission to the Board of Direction, and a committee was appointed to draft by-laws.

The following officers were elected: President, Frank T. Darrow; Senior Vice-President, Adna Dobson; Junior Vice-President, George L. Campen; Secretary-Treasurer, Homer V. Knouse.

The following Legislative Committee was appointed: William Grant, Chairman, John L. Hershey, H. H. Tracy, D. D. Price, John A. Bruce, H. A. Holdrege, and R. A. Swartwout.

The meeting adjourned for dinner.

The meeting was reconvened at 8 P. M.; President Darrow in the chair.

Following a brief address by the President, J. C. Wonders, Esq., District Engineer of the Department of Public Roads of the Department of Agriculture, addressed the meeting on the Federal Aid Law, and explained its requirements with regard to existing Nebraska laws. He called attention to the probable need of additional legislation to make the Federal appropriation available, and urged the Association to make every effort to further the passage of a desirable measure. The Federal Aid Law and State aid in building roads was discussed.

Mr. Grant suggested the desirability of having a paper presented at a later meeting of the Association on the Alignment of Highways on topographic rather than on section lines.

Mr. Bruce called attention to a bill to be presented to the coming session of the Nebraska Legislature regarding sewerage systems in cities of less than 25 000 population.

Mr. Bruce also stated that he understood that a License Law for Architects would be presented to the coming session of the Nebraska Legislature, and urged action by the Legislative Committee if such a bill was not for the best interests of engineers.

The Secretary was instructed to thank L. W. Page, M. Am. Soc. C. E., Director of the Office of Public Roads, for his courtesy in arranging for Mr. Wonders' address.

By-laws were adopted.

The President announced the appointment of a Membership Committee consisting of Messrs. George T. Prince, Homer V. Knouse, W. S. Wills, and A. Dobson.

The President appointed Messrs. William Grant and C. E. Mickey as a committee to make arrangements for the next meeting, the subject to be discussed being the location of highways on section lines or according to topographic conditions.

The President appointed a Publicity Committee consisting of Messrs. George L. Campen and D. D. Price.

Adjourned.

**Northwestern Association, Organized 1914.**

President, George L. Wilson; Secretary, Ralph D. Thomas, 508 South First Street, Minneapolis, Minn.

**Philadelphia Association, Organized 1913.**

President, Samuel T. Wagner; Secretary, C. W. Thorn, 1313 South Broad Street, Philadelphia, Pa.

The regular meetings of the Association are held at the Engineers' Club of Philadelphia, 1317 Spruce Street, on the first Monday in January, April, and October, the last being the Annual Meeting.

**Portland, Ore., Association, Organized 1913.**

President, J. P. Newell; Secretary, J. A. Currey, 194 North 13th Street, Portland, Ore.

**St. Louis Association, Organized 1914.**

President, J. A. Ockerson; Secretary-Treasurer, Gurdon G. Black, 34 East Grand Avenue, St. Louis, Mo.

The meetings of the Association are held at the Engineers' Club Auditorium. The Annual Meeting is held on the fourth Monday in November. The time of other meetings is not fixed, but this information will be furnished on application to the Secretary.

**San Diego Association, Organized 1915.**

President, W. J. Gough; Secretary-Treasurer, J. R. Comly, 4105 Falcon Street, San Diego, Cal.

**Seattle Association, Organized 1913.**

President, Joseph Jacobs; Secretary-Treasurer, Carl H. Reeves, 444 Henry Building, Seattle, Wash.

The regular meetings of the Association are held at 12.15 P. M., on the last Monday of each month, at The Arctic Club.

(Abstract of Minutes of Meetings)

**December 18th, 1916.**—The meeting was called to order at 12.15 P. M., at the Arctic Club; President Powell in the chair; Carl H. Reeves, Secretary; and present, also, 15 members.

The minutes of the meeting of November 27th, 1916, were read and, with certain corrections, approved.

Owing to the fact that, at the time of the election of Messrs. Robert Howes and John L. Hall as councilors in the Associated Engineering Societies of Seattle, their terms of office had not been designated, it was ordered that Mr. Howe's term end on January 28th, 1917, and Mr. Hall's term on January 28th, 1918.

The Legislative Committee reported on the bill proposed to regulate water supply and sewage disposal within the State. The committee recommended the approval of the bill as to plan and scope. After striking out the reference to a member of the faculty of the University of Washington as the sanitary engineer of the State Board of Health, the report of the committee was adopted.

The Legislative Committee reported on the matter of the licensing of engineers. The committee's report on the bill for the licensing

of land surveyors was adopted. The Legislative Committee reported on the registration bill for architects. The Committee reported that it had found nothing objectionable in the bill, but believed that the word "exclusively", as applied to architectural practice, might lead to unpleasant complications. The report was adopted.

The President was requested to appoint three members of the Association to arrange for the Annual Meeting to be held on January 29th, 1917.

Adjourned.

**January 29th, 1917.**—The Annual Meeting was called to order at 7 p. m., at the Arctic Club; President Powell in the chair; Carl H. Reeves, Secretary; and present, also, 49 members and guests.

The Secretary-Treasurer presented his report, which was adopted. The auditing of the accounts of the Secretary-Treasurer was waived.

The President delivered his Annual Address, dealing largely with the ethics of the Profession.

A moving picture film entitled "King of the Rails", and illustrating the early history of transportation and its development, up to the present electrification of the Chicago, Milwaukee and St. Paul Railway in Montana, was presented through the courtesy of the General Electric Company. A vote of thanks was extended to Mr. J. F. Pinson, the General Electric Company, and the Chicago, Milwaukee and St. Paul Railway Company.

The minutes of the meeting of December 18th, 1916, were read and approved.

The resignation of Mr. H. F. Flynn, who had removed to Philadelphia, was presented and accepted.

The Secretary presented a letter from the Associated Engineering Societies of Seattle, giving notification of the leasing of quarters for library and committee purposes, and of an arrangement with the Chamber of Commerce for the use of its auditorium for the larger meetings.

The Secretary presented a letter from the Associated Engineering Societies of Seattle notifying the Association of the action of that body relative to the Land Surveyors Licensing Bill.

A note of greeting from Mr. T. W. Jaycox, President of the Colorado Association, was read.

An amendment to the By-laws increasing the dues from \$2 to \$3 per annum, in order to meet the increased expenses of the Association in connection with its affiliation with the Associated Engineering Societies of Seattle, was presented and will be voted on at the meeting of February 26th, 1917.

The following officers for the ensuing year were elected: President, Joseph Jacobs; Vice-President, F. F. Sinks; Secretary-Treasurer, Carl H. Reeves.

The term of Mr. Robert Howes, as a Councilor from this Association to the Joint Council of The Associated Engineering Societies of Seattle, having expired, he was unanimously re-elected for the term of two years.

In reference to the second Architects Bill, Mr. Hussey stated that it was modeled after the Illinois Architects Bill, and stated some of its objectionable features.

Mr. Downey explained the bill, now before the Legislature, to make the office of County Engineer appointive by Boards of County Commissioners, instead of an elective office.

It was ordered that The Associated Engineering Societies of Seattle be requested to appropriate the necessary funds to represent the Engineering Profession properly before the present Legislature, in order to insure the passage or defeat of bills, as may seem best.

The subject of the inter-relations between the Parent Society and Local Associations was discussed informally.

On the question as to whether the regular monthly meetings should be held at noon or in the evening, it was decided to take an informal vote of the members present and lay the result before the Executive Committee for its guidance. The informal vote showed that 23 were in favor of evening meetings and 10 in favor of noon meetings.

It was ordered that the Joint Council of The Associated Engineering Societies of Seattle be requested to appoint three persons from each of the signatory bodies making up the Joint Council to visit Olympia, if necessary, and press such matters as may be required by the Profession and by the Joint Council.

Adjourned.

#### **Southern California Association, Organized 1914.**

President, H. Hawgood; Secretary, W. K. Barnard, 1105 Central Building, Los Angeles, Cal.

The Southern California Association of Members of the American Society of Civil Engineers (Los Angeles, Cal.) holds regular bi-monthly meetings, with banquet, at Hotel Clark, on the second Wednesday of February, April, June, August, October, and December, the last being the Annual Meeting of the Association.

Informal luncheons are held at 12.15 p. m. every Wednesday, and the place of meeting may be ascertained from the Secretary.

The by-laws of the Association provide for the extension of hospitality to any member of the Society who may be temporarily in Los Angeles, and any such member will be gladly welcomed as a guest at any of the meetings or luncheons.

#### **Spokane Association, Organized 1914.**

President, J. C. Ralston; Secretary, B. J. Garnett, City Hall, Spokane, Wash.

The regular meetings of the Association are held on the second Friday of each month, except July and August. The hour and place of meeting are not fixed, but this information will be furnished on application to the Secretary.

Visiting members are invited to attend the meetings and luncheons.

#### **(Abstract of Minutes of Meeting)**

**January 5th, 1917.**—The adjourned Annual Meeting was called to order at 12 m., at the University Club; President E. G. Taber in



the chair; B. J. Garnett, Secretary; and present, also, members and guests.

The report of the Secretary and Treasurer, the latter showing a balance of \$59.25, was read and accepted.

The following officers were elected: President, J. C. Ralston; and Vice-President, Peter Mogensen.

Adjourned.

#### **Texas Association, Organized 1913.**

President, John B. Hawley; Secretary, J. F. Witts, Dallas, Tex.

#### **Utah Association, Organized 1916.**

President, E. C. La Rue; Secretary-Treasurer, H. S. Kleinschmidt, 306 Dooley Building, Salt Lake City, Utah.

### **MINUTES OF MEETINGS OF SPECIAL COMMITTEES**

#### **TO REPORT UPON ENGINEERING SUBJECTS**

##### **Special Committee on Steel Columns and Struts**

**January 18th, 1917.**—The meeting was called to order at 11 A. M., on board the Municipal Ferryboat *Brooklyn* on the Boat Excursion of the Society. Present, Messrs. James H. Edwards, C. W. Hudson, Charles F. Loweth, George H. Pegram, and Lewis D. Rights. Dr. Olshausen and Professor Nelson, of the Bureau of Standards, were also present.

Mr. Pegram, President of the Society, stated that he, as *ex officio* member of all special committees, did not feel that he should serve longer as Chairman of the Committee. He had presented his resignation, as Chairman of the Committee, to the Board of Direction, and was authorized to appoint a new chairman. He then appointed Mr. Lewis D. Rights as Chairman. Mr. C. W. Hudson was elected to succeed Mr. Rights as Secretary.

Dr. Olshausen reported that 102 specimen tests had been made from the material of the tested columns. The specimens tested were all taken from the light and extra heavy material.

On motion, duly seconded, Mr. Rights was appointed a committee of one to go to Washington and arrange with the Director of the Bureau of Standards a programme for completing tests representing all the column material.

On motion, duly seconded, it was ordered that, for the purpose of comparing the results of the tests of the specimen with the results of the tests for the full-sized columns, the so-called yield point be arbitrarily fixed at the unit stress having a tangent modulus of one-half the amount of the tangent modulus to the stress-strain curve near the origin.

The meeting adjourned at 12.30 P. M.

**PRIVILEGES OF ENGINEERING SOCIETIES  
EXTENDED TO MEMBERS OF THE  
AMERICAN SOCIETY OF CIVIL ENGINEERS**

Members of the American Society of Civil Engineers will be welcomed by the following Engineering Societies, both to the use of their Reading Rooms, and at all meetings:

**American Institute of Electrical Engineers**, 25 West Thirty-ninth Street, New York City.

**American Institute of Mining Engineers**, 25 West Thirty-ninth Street, New York City.

**American Society of Mechanical Engineers**, 25 West Thirty-ninth Street, New York City.

**Architekten-Verein zu Berlin**, Wilhelmstrasse 92, Berlin W. 66, Germany.

**Associação dos Engenheiros Civis Portuguezes**, Lisbon, Portugal.  
**Australasian Institute of Mining Engineers**, Melbourne, Victoria, Australia.

**Boston Society of Civil Engineers**, 715 Tremont Temple, Boston, Mass.

**Brooklyn Engineers' Club**, 117 Remsen Street, Brooklyn, N. Y.

**Canadian Society of Civil Engineers**, 176 Mansfield Street, Montreal, Que., Canada.

**Civil Engineers' Society of St. Paul**, St. Paul, Minn.

**Cleveland Engineering Society**, Chamber of Commerce Building, Cleveland, Ohio.

**Cleveland Institute of Engineers**, Middlesbrough, England.

**Dansk Ingeniorforening**, Amaliegade 38, Copenhagen, Denmark.

**Detroit Engineering Society**, 46 Grand River Avenue, West, Detroit, Mich.

**Engineers and Architects Club of Louisville**, 1412 Starks Building, Louisville, Ky.

**Engineers' Club of Baltimore**, 6 West Eager Street, Baltimore, Md.

**Engineers' Club of Kansas City**, E. B. Murray, Secretary, 920 Walnut Street, Kansas City, Mo.

**Engineers' Club of Minneapolis**, 17 South Sixth Street, Minneapolis, Minn.

**Engineers' Club of Philadelphia**, 1317 Spruce Street, Philadelphia, Pa.

**Engineers' Club of St. Louis**, 3817 Olive Street, St. Louis, Mo.

**Engineers' Club of Toronto**, 96 King Street, West, Toronto, Ont., Canada.

**Engineers' Club of Trenton**, Trent Theatre Building, 12 North Warren Street, Trenton, N. J.

**Engineers' Society of Northeastern Pennsylvania**, 415 Washington Avenue, Scranton, Pa.

- Engineers' Society of Pennsylvania**, 31 South Front Street, Harrisburg, Pa.
- Engineers' Society of Western Pennsylvania**, 2511 Oliver Building, Pittsburgh, Pa.
- Institute of Marine Engineers**, The Minories, Tower Hill, London, E., England.
- Institution of Civil Engineers**, Great George Street, Westminster, S. W., London, England.
- Institution of Engineers of the River Plate**, Calle 25 de Mayo 195, Buenos Aires, Argentine Republic.
- Institution of Naval Architects**, 5 Adelphi Terrace, London, W. C., England.
- Junior Institution of Engineers**, 39 Victoria Street, Westminster, S. W., London, England.
- Koninklijk Instituut van Ingenieurs**, The Hague, The Netherlands.
- Louisiana Engineering Society**, State Museum Building, Chartres and St. Ann Streets, New Orleans, La.
- Memphis Engineers' Club**, Memphis, Tenn.
- Midland Institute of Mining, Civil and Mechanical Engineers**, Sheffield, England.
- Montana Society of Engineers**, Butte, Mont.
- North of England Institute of Mining and Mechanical Engineers**, Newcastle-upon-Tyne, England.
- Oesterreichischer Ingenieur- und Architekten-Verein**, Eschenbachgasse 9, Vienna, Austria.
- Oregon Society of Civil Engineers**, Portland, Ore.
- Pacific Northwest Society of Engineers**, 312 Central Building, Seattle, Wash.
- Rochester Engineering Society**, Rochester, N. Y.
- Sachsischer Ingenieur- und Architekten-Verein**, Dresden, Germany.
- Sociedad Colombiana de Ingenieros**, Bogota, Colombia.
- Sociedad de Ingenieros del Peru**, Lima, Peru.
- Societe des Ingenieurs Civils de France**, 19 rue Blanche, Paris, France.
- Society of Engineers**, 17 Victoria Street, Westminster, S. W., London, England.
- Svenska Teknologforeningen**, Brunkebergstorg 18, Stockholm, Sweden.
- Tekniske Forening**, Vestre Boulevard 18-1, Copenhagen, Denmark.
- Vermont Society of Engineers**, George A. Reed, Secretary, Montpelier, Vt.
- Western Society of Engineers**, 1737 Monadnock Block, Chicago, Ill.

## ACCESSIONS TO THE LIBRARY

(From January 1st to February 6th, 1917)

## DONATIONS\*

## STEEL RAILWAY BRIDGES:

Designs and Weights. By Edward C. Dilworth, Assoc. M. Am. Soc. C. E. Cloth,  $9\frac{1}{2} \times 12\frac{1}{2}$  in., illus., 8 + 185 pp. New York, D. Van Nostrand, 1916. (Donated by the Author.) \$4.00.

This volume was written, the preface states, to supply practical data for the design and weight of steel for railway bridges. Weight curves have been plotted for all types of bridges, except arch, cantilever, and suspension, using the specifications for railway bridges of the American Railway Engineering Association of 1912 and Cooper's Standard loadings, E 40, E 50, and E 60. Stress sheets also can be used by the designing engineer as a reference in determining the size, make-up of sections, and general features of design. All the designs, computations, and drawings were made especially for this volume. Many points of the general design and details are covered by the specifications, which are reprinted by permission. It is believed that this book will be in the nature of a supplement to modern textbooks on bridge design. The general drawing and notes for drawbridge, containing many interesting features, were prepared from data furnished by C. F. Loweth, M. Am. Soc. C. E. A partial list of Contents is: Designing; Centrifugal Force; Draw Spans; Turntables; Detailing; Specifications for Railway Bridges, Am. Ry. Eng. Assoc.; Deck Plate Girders; Double-Track Through Plate Girders; Single-Track and Double-Track Pony Riveted Spans—Weight Curves; Single-Track and Double-Track Through Riveted Spans—Weight Curves; Single-Track and Double-Track Viaducts—Weight Curves; Turntables, etc., etc.

## UNDERGROUND TRANSMISSION AND DISTRIBUTION:

For Electric Light and Power. By E. B. Meyer. Cloth,  $9\frac{1}{2} \times 6\frac{1}{2}$  in., illus., 8 + 312 pp. New York, McGraw-Hill Book Company; London, Hill Publishing Company, 1916. \$3.00.

The preface states that the aim of this book is to deal with the construction and operation of underground systems and details of this branch of central station work. It does not include such data as can be obtained from handbooks or the fundamentals of electrical theory. The subject-matter is treated from the American point of view. A part of the material contained in this volume originally appeared in the various reports of the National Electric Light Association Committee on Underground Construction. The Contents are: Historical; Preliminary Survey; Conduits and Man-hole Construction; Methods of Distribution; Cables; Installation of Cables; Testing Cables; Distribution Systems and Auxiliary Equipment; Electrolysis; Operation and Maintenance; Index.

## PRACTICAL STREET CONSTRUCTION:

Planning Streets and Designing and Constructing the Details of Street Surface, Subsurface and Supersurface Structures. Reprinted from a Series of Articles Which Appeared in *Municipal Journal* During 1916. Cloth,  $9\frac{1}{2} \times 6$  in., illus., 8 + 248 pp. New York, Municipal Journal and Engineer, 1916. \$2.00.

The preface states that the aim of this book has been to take up the discussion of complex modern city street construction, such as alignment, grade and cross-section, the location of sewers and other underground constructions, and their above-ground appurtenances such as manholes and fire hydrants, fire alarm boxes, shade trees and street signs, and a score of other features. The twenty-eight chapters herein contained appeared as so many installments in the *Municipal Journal* during 1916, and with few exceptions, were written by the Editorial Department. A partial list of Contents is: What Streets are Used For; Planning Street Alignments; Diagonal Thoroughfares; Planning Thoroughfares; Street Planning; Street Widths; Minor Residence Streets; Local and Elastic Streets; Street Cross-Section; Motor Trucks and Street Grades; Planning Grades; Intersection Grades; Gutters; Sidewalks and Sidewalk Construction; etc., etc.

\*Unless otherwise specified, books in this list have been donated by the publishers.

**STANDARD SPECIFICATIONS:**

Steel for Bridges, Buildings, Locomotives, Cars, and Ships, Boilers and Rivets, Concrete Reinforcement, Wheels and Gear Blanks, Axles and Shafts. Sixth Edition. Paper,  $7\frac{1}{4}$  x 5 in., illus., 170 pp. Pittsburgh, Carnegie Steel Company, 1917.

This book contains the specifications adopted by the Association of American Steel Manufacturers; the American Society for Testing Materials; Carnegie Steel Company; Master Car Builders' Association; American Railway Engineering Association; and the American Bridge Company.

**POCKET COMPANION FOR ENGINEERS, ARCHITECTS, AND BUILDERS:**

Containing Useful Information and Tables Appertaining to the Use of Steel Manufactured by the Carnegie Steel Company, Pittsburgh, Pa. Nineteenth Edition, Revised. Morocco,  $7\frac{1}{4}$  x 5 in., illus., 440 pp. Pittsburgh, Carnegie Steel Company. \$1.50.

This nineteenth edition contains the revised data of the sixteenth edition. The preface states that since 1903, the date of the fifteenth edition, there have been many changes in the art of bridge and building construction with the extension of the use of steel into other lines than those covered by that edition. The endeavor in the sixteenth and subsequent issues has been to eliminate obsolete forms of construction and to revise the forms retained from the fifteenth edition in order to make them conformable to present standard practice. This book differs from the sixteenth edition in the addition of tables of standard punching in flanges of beams and channels and in the extension of the tables of extreme sizes of plates to include nickel steel. The sizes of channels, bulb angles, checkered plates, merchant bars, etc., have also been revised. The American Society for Testing Materials Specifications appear in the forms adopted at their latest revision. The volume contains illustrations selected from a large number of rolled shapes in profiles and tables most suitable for use in bridge, building, locomotive, car, and ship construction.

Gifts have also been received from the following:

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 Woolson, Ira H. 1 pam.  
 Worcester Polytechnic Inst. 1 pam.  
 Wyoming-State Engr. 1 bound vol.  
 Wyoming-State Geologist. 1 pam.

## SUMMARY OF ACCESSIONS

(From January 1st to February 6th, 1917)

Donations (including 6 duplicates).....213

## MEMBERSHIP

(From January 5th to February 8th, 1917)

## ADDITIONS

MEMBERS		Date of Membership.
AMIOU, PIERRE EDMOND. Dist. Engr., Dept. of Public Works of Canada, Chicoutimi, Que., Canada.....		Nov. 28, 1916
AREND, ALBERT CORNELIUS. Cons. Engr., Bran-	} Assoc. M.	Feb. 2, 1909-
deis Bldg., Omaha, Nebr.....		Jan. 16, 1917
AVERY, CHARLES DWIGHT. Carey Act. Insp.,	} Assoc. M.	Jan. 2, 1912
Gen. Land Office, Dept. of the Interior,		Jan. 16, 1917
P. O. Box 336, Cheyenne, Wyo.....	} M.	June 4, 1902
BANKS, JOHN EDWIN. Asst. to Div. Mgr.,		Jan. 16, 1917
Am. Bridge Co., Ambridge, Pa.....	} M.	Sept. 12, 1916
BROWER, JOHN LAFAYETTE. Mgr., Bridge Dept., Canadian		Jan. 15, 1917
Allis-Chalmers, Ltd., Toronto, Ont., Canada.....		
BUCK, FRED. P. O. Box 161, Rockledge, Fla.....		Sept. 12, 1916
BURKE, JOHN RYAN. Engr.-Contr., 78 Devonshire St.,		Jan. 15, 1917
Boston, Mass.....		
BURRAGE, JOHN OTIS. Cons. Engr., 24 Presidio	} Jun.	Mar. 1, 1904
Ave., San Francisco, Cal.....		Nov. 4, 1908
	} Assoc. M.	Jan. 16, 1917
COLLINS, CHARLES DICKEY. In-Chg. of Design and Draft-		
ing Dept., Aetna Explosives Co., 20 West 84th St.,		
New York City.....		Jan. 15, 1917
CUNNINGHAM, MAX LEE. State Engr., State	} Assoc. M.	May 6, 1914
Capitol, Oklahoma, Okla.....		Oct. 10, 1916
DIXON, GEORGE GALE. Civ. Engr., Div. of	} Assoc. M.	July 9, 1912
Water, 102 East Mill St., Akron, Ohio.		Jan. 16, 1917
FLEMING, BURTON PERCIVAL. Prof. of Steam	} Assoc. M.	May 28, 1912
Eng., and Head of Dept. of Mech. Eng.,		Jan. 16, 1917
State Univ. of Iowa, Iowa City, Iowa..	} M.	Jun. May 3, 1898
KAHN, JULIUS. Pres. and Gen. Mgr., Trussed		Oct. 3, 1900
Concrete Steel Co., Youngstown, Ohio.	} M.	Jan. 16, 1917
MOORE, CLIFFORD BENNETT. Cons. Engr., Bor-		
ough of Queens, Borough Hall, Long	} Assoc. M.	Aug. 31, 1915
Island City, N. Y.....		Nov. 28, 1916
PRATT, HENRY BLANCHARD. Asst. Engr., J. R.	} Assoc. M.	June 1, 1909
Worcester & Co.; Res., 750 Lexington		Jan. 16, 1917
St., Waltham, Mass.....	} M.	
QUINLAN, GEORGE AUSTIN. Supt. of High-		
ways, Cook County, 325 County Court	} Assoc. M.	Oct. 1, 1912
House, Chicago, Ill.....		Jan. 16, 1917
TAYLOR, WILLIAM THOMAS. Capt., R. F. C., 25 Harling		
St., Burnley, Lancashire, England.....		Nov. 28, 1916

## MEMBERS (Continued)

		Date of Membership.
TEFFT, WILLIAM WOLCOTT. In Gen. Chg. of Economics and Reports Dept., Fargo Eng. Co., 722 West Main St., Jackson, Mich.....	Jun.	Mar. 31, 1908
	Assoc. M.	Jan. 2, 1912
	M.	Oct. 10, 1916
TOTTEN, ROBERT LYLE. 1603 Empire Bldg., Birmingham, Ala.....		Nov. 28, 1916

## ASSOCIATE MEMBERS

ALDERMAN, ERNEST SAMUEL. U. S. Junior Highway Engr., U. S. Dept. of Agriculture, De Ridder, La.....	Jun.	Oct. 3, 1911
	Assoc. M.	Jan. 15, 1917
ARDERY, EDWARD DAHL. Capt., Corps of Engrs., U. S. A., 39 Whitehall St., New York City.....		Jan. 15, 1917
ARMSTRONG, HARRY ARTHUR. Asst. Engr., State Reclamation Board, 15 Parkview Apartments, Sacramento, Cal.....	Jun.	Mar. 4, 1914
	Assoc. M.	Jan. 15, 1917
ARMSTRONG, MERWIN. With R. H. & G. A. Williams, 510 Exchange Bldg., Memphis, Tenn.....		Jan. 15, 1917
BARTLETT, WILLIAM ANDREWS. Res. Engr., Am. Brass Co., 573 Naugatuck Ave., Devon, Conn.....	Jun.	Jan. 31, 1911
	Assoc. M.	Jan. 15, 1917
BENKERT, HARRY NEWTON. Prof. of Civ. Eng., Drexel Inst., 5901 Christian St., Philadelphia, Pa.....		Nov. 28, 1916
BENNETT, CHARLES ROBERTS. Dist. Engr., Bureau of Public Works, Manila, Philippine Islands.....		Nov. 28, 1916
BONNER, JOHN POLLOCK. Res. Engr., C. & O. Ry., Seth, W. Va.....		Jan. 15, 1917
BORNEFELD, CHARLES FOWLER. Res. Engr., Concrete Steel Eng. Co. Room 30, City Hall, Minneapolis, Minn.....	Jun.	May 31, 1910
	Assoc. M.	Jan. 15, 1917
BURNS, HOWARD EDWARD. Chf. Engr., C. F. Massey Co., 840 Sunnyside Ave., Chicago, Ill.....		Sept. 12, 1916
CARPENTER, HARRY KERBAUGH. Chf. Engr., Concrete Steel Bridge Co., 709 Union Bank Bldg., Clarksburg, W. Va.....		Jan. 15, 1917
CLIFFORD, WALTER WOODBRIDGE. Structural Engr., Densmore & Le Clear; Res. 52 Milton Ave., Hyde Park, Mass.....	Jun.	Nov. 8, 1909
	Assoc. M.	Jan. 15, 1917
COLGAN, ROBERT JOSEPH. Asst. Superv., P. R. R., Y. M. C. A., Room 508, Erie, Pa.	Jun.	Sept. 1, 1908
	Assoc. M.	Jan. 15, 1917
DAKIN, ROBERT EDWARD. Asst. Engr., The Connecticut Co., 330 Alden Ave., New Haven, Conn.....	Jun.	Dec. 2, 1914
	Assoc. M.	Jan. 15, 1917
DANFORTH, RICHARD STEVENS. Mgr., Pacific Coast Branch, Kinney Mfg. Co., 316 Rialto Bldg., San Francisco, Cal.		Jan. 15, 1917

ASSOCIATE MEMBERS (Continued)		Date of Membership.
DINGMAN, CHARLES FRANCIS. In Chg., Eng. Dept., Flynt Bldg. & Constr. Co., 15 Grove St., Palmer, Mass....		Nov. 28, 1916
DONNELLY, ALBERT LEE. Asst. Engr., The Connecticut Co., Box 50, New Haven, Conn.....		Jan. 15, 1917
EBERLY, VIRGIL ALLEN. Engr. Draftsman and Computer with War Dept., Office of Key Bridge, 2728 Pennsylvania Ave. (Res., 1014 Douglas St., N. E.), Washington, D. C.....	Jun. Assoc. M.	June 6, 1911 Jan. 15, 1917
ECKERT, OTTO ELIS. Asst. City Engr., 1229 South Washington Ave., Saginaw, Mich.....		Oct. 10, 1916
ELDER, JAMES HARRY. Engr. in Chg. of Squad, Am. Bridge Co., 716 Parkroad, Ambridge, Pa.....		Oct. 10, 1916
GALE, LELAND ISAAC. 6053 Chabot Rd., Oakland, Cal....		Jan. 15, 1917
GEBHARDT, JOHN FREDERICK WILLIAM. Estudio Tecnico Norrone, Casilla Correo 334, Asuncion, Paraguay.....	Jun. Assoc. M.	Feb. 4, 1913 Nov. 28, 1916
GELWIX, DANIEL EDMUND. Valuation Engr., Kansas City, Clinton & Springfield Ry., 713 Woodruff Bldg., Springfield, Mo.....		Oct. 10, 1916
GORDON, JOHN GARDNER, JR. Chf. Engr., Layne & Bowler Corporation, 900 Santa Fe Ave., Los Angeles, Cal...		Jan. 15, 1917
HARRAH, ORIN WILSON. Junior Engr., U. S. Reclamation Service, Poplar, Mont....	Jun. Assoc. M.	June 24, 1914 Jan. 15, 1917
HAUN, GEORGE CLEVELAND. Designer, Chicago Office, Am. Bridge Co., 208 South La Salle St., Room 1329, Chicago, Ill..	Jun. Assoc. M.	Oct. 1, 1912 Jan. 15, 1917
HEATLEY, THOMAS. Engr. Insp., Bureau of Bldgs., Bronx Borough, Borough Hall, Third Ave. and 177th St., New York City.....		Jan. 15, 1917
HYNDS, HAROLD DEVILLO. Secy., Am. Concrete Inst., 30 Broad St., New York City.....		Jan. 15, 1917
INGHAM, EDWIN AMBLER. Asst. Supt. of Constr., Phoenix Constr. Co., Grace, Idaho .....	Jun. Assoc. M.	Jan. 6, 1915 Jan. 15, 1917
JONES, EDWARD LINDLEY. Engr., Hoeffler & Co., 2811 Harrison St., Evanston, Ill.....		Sept. 12, 1916
LYNDE, CLIFFORD. Asst. Engr., Cranford Co. (Res., 359 St. Johns Pl.), Brooklyn N. Y.....	Jun. Assoc. M.	Dec. 1, 1908 Nov. 28, 1916
METCALF, BRADLEY REVERE. With Los Angeles County Board of Flood Control, 1423 Curson Ave., Los Angeles, Cal.....		Oct. 10, 1916
ROBINSON, JOHN HARVEY. Eng. Mgr., Sharon Coal & Limestone Co., 245 South Pitt St., Mercer, Pa.....		Jan. 15, 1917

ASSOCIATE MEMBERS (*Continued*)

	Date of Membership.
ROHN, RALPH EARLE. With E. J. Landor, 964 McKinley Ave., N. W., Canton, Ohio.....	Nov. 28, 1916
SESSLER, GROVER CLEVELAND. Asst. to Plant Engr., Midvale Steel Co., Nicetown, Philadelphia, Pa.....	Jan. 15, 1917
SLOANE, FRED MATHEWS. 4049 Sheridan Rd., Chicago, Ill..	Jan. 15, 1917
SMYTH, ARTHUR PORTER. Asst. Engr., U. S. }	Jun. Jan. 3, 1911
Reclamation Service, Dixon, Mont..... }	Assoc. M. Jan. 15, 1917
SNIGGS, CLARK DEE. Care, U. S. Engrs., 815 Witherspoon Bldg., Philadelphia, Pa.....	Sept. 12, 1916
TAKAHASHI, SEISUKE. Asst. Designing Engr., Bridge Dept., Kansas City Terminal Ry., Kansas City, Mo.....	Jan. 15, 1917
THOMSON, FRED MORTON. Div. Engr., M., K. }	Jun. Oct. 6, 1908
& T. Ry., Parsons, Kans..... }	Assoc. M. Nov. 28, 1916
TOURTELLOT, EDWARD BOYINGTON. County Engr., Clayton County, Elkader, Iowa.....	Oct. 10, 1916
WATSON, CARL HAWLEY. Great Neck Station, N. Y.....	Jan. 15, 1917
WATSON, GEORGE LINTON. Chf. Engr. and Gen. Supt., Continental Public Works Co. of New York, Giddens Bldg., Tampa, Fla.....	Jan. 15, 1917
WIG, RUDOLPH JAMES. Engr. Physicist, Bureau of Standards, 2952 Newark St., Washington, D. C.....	Sept. 12, 1916
WILLARD, GEORGE THOMPSON. Insp., The Rail Joint Co., 408 Commonwealth Bldg., St. Louis, Mo.....	Nov. 28, 1916
WILMOT, JAMES. In. Chg., Section 5, Routes 4 and 36, Broadway-Fourth Ave. Rap. Trans. R. R., 1711 University Ave., New York City.....	Jun. Sept. 1, 1908 Assoc. M. Nov. 28, 1916

## ASSOCIATES

BENT, ARTHUR SAMUEL. (Bent Bros.), 825 Central Bldg., Los Angeles, Cal.....	Nov. 28, 1916
WHITNEY, PARKER RICHARDS. Draftsman, Am. Bridge Co., 510 Park Rd., Ambridge, Pa.....	Jan. 15, 1917

## JUNIORS

ANDREWS, HARRY SAMUEL. 514 Cherokee St., South Bethlehem, Pa.....	Sept. 12, 1916
ASHKINS, NATHAN THOMAS. Gen. Mgr., Jefferson Cement Tile Co., 539 Franklin St., Louisville, Ky.....	Jan. 15, 1917
GARDNER, GEORGE WASHINGTON. P. O. Box 92, Madison, N. J.....	Jan. 15, 1917
GRIGSBY, WALTER BERTON. Engr., Trussed Concrete Steel Co., 16 Tacoma Ave., Youngstown, Ohio.....	Oct. 10, 1916
KANE, DANIEL COUGHLIN. Asst. to Prof. James S. Macgregor, Columbia Univ. Testing Laboratory, 469 Forty-seventh St., Brooklyn, N. Y.....	Jan. 15, 1917



# 160 MEMBERSHIP—ADDITIONS, RESIGNATIONS, DEATHS [Society Affairs.

## JUNIORS (Continued)

	Date of Membership.
MASLEN, HAROLD CARPENDALE. 2312 University Ave., New York City.....	Jan. 15, 1917
MILHAN, DAVID NELSON. Div. Engr., Portland Cement Assoc., 1123 Hurt Bldg., Atlanta, Ga.....	Jan. 15, 1917
PEARCE, RUFUS BURLESON. 319 North Park St., Madison, Wis.....	Nov. 28, 1916
REEVES, GLENN STANTON. Draftsman, Pennsylvania Steel Co., 1524 North 2d St., Harrisburg, Pa.....	Nov. 28, 1916
STEPHENS, UEL. Box 404, Vicksburg, Miss.....	Jan. 15, 1917
TURNER, DANIEL NORMAN. 16 MacPherson St., Mount Airy, Philadelphia, Pa.....	Nov. 28, 1916
VAN BUREN, MAURICE PELHAM. The Cedars, New Brighton, N. Y.....	Jan. 15, 1917
VAN SISE, ANDREW JACKSON. County Engr., Audubon County, Audubon, Iowa.....	Jan. 15, 1917
WHALEN, WILLIAM EDWARD. Asst. to Gen. Supt. of Bldg. Constr., Willys Overland Co. (Res., 2309 Fulton St.), Toledo, Ohio.....	Nov. 28, 1916
WHITE, DAVID EWING. Draftsman, Chf. Engr.'s Office, L. & N. R. R., Louisville, Ky.....	Nov. 28, 1916

## REINSTATEMENTS

### MEMBERS

	Date of Reinstatement.
NEILSON, CHARLES.....	Jan. 15, 1917

## RESIGNATIONS

### ASSOCIATE MEMBERS

	Date of Resignation.
MCDARGH, HARRY JOHN.....	Dec. 31, 1916
QUIRK, JAMES FRANCIS.....	Jan. 15, 1917

## JUNIORS

BRADSTREET, HERBERT NEAL.....	Dec. 31, 1916
OSBORN, JESSE THOMAS.....	Jan. 15, 1917
STANFORD, JAMES LELAND.....	Dec. 31, 1916

## DEATHS

- CUNNINGHAM, ANDREW CHASE. Elected Associate Member, September 2d, 1891; Member, October 3d, 1894; died January 13th, 1917.
- EVANS, RICHARD. Elected Member, June 7th, 1893; died December 30th, 1916.
- MCCOLLOM, THOMAS CHALMERS. Elected Member, May 3d, 1882; died January 4th, 1917.

MAXIM, *Sir* HIRAM STEVENS. Elected Member, October 7th, 1885; died November 24th, 1916.

MOULD, GEORGE ALEXANDER HUTCHINGS. Elected Associate Member, December 7th, 1904; died January 21st, 1917.

SMITH, WILLIAM STUART. Elected Associate Member, January 8th, 1902; died November 5th, 1916.

STOTT, HENRY GORDON. Elected Member, July 1st, 1908; died January 15th, 1917.

THOMSON, SAMUEL FORSYTHE. Elected Associate Member, January 3d, 1906; died January 30th, 1917.

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**Total Membership of the Society, February 8th, 1917,**

**8 221.**

# MONTHLY LIST OF RECENT ENGINEERING ARTICLES OF INTEREST

(January 2d to February 1st, 1917)

NOTE.—This list is published for the purpose of placing before the members of this Society, the titles of current engineering articles, which can be referred to in any available engineering library, or can be procured by addressing the publication directly, the address and price being given wherever possible.

## LIST OF PUBLICATIONS

In the subjoined list of articles, references are given by the number prefixed to each journal in this list:

- |   |  |
|---|--|
| (2) <i>Proceedings, Engrs. Club of Phila., Philadelphia, Pa.</i>                    | (30) <i>Annales des Travaux Publics de Belgique, Brussels, Belgium, 4 fr.</i>                          |
| (3) <i>Journal, Franklin Inst., Philadelphia, Pa., 50c.</i>                         | (31) <i>Annales de l'Assoc. des Ing. Sortis des Ecoles Spéciales de Gand, Brussels, Belgium, 4 fr.</i> |
| (4) <i>Journal, Western Soc. of Engrs., Chicago, Ill., 50c.</i>                     | (32) <i>Mémoires et Compte Rendu des Travaux, Soc. Ing. Civ. de France, Paris, France.</i>             |
| (5) <i>Transactions, Can. Soc. C. E., Montreal, Que., Canada.</i>                   | (33) <i>Le Génie Civil, Paris, France, 1 fr.</i>   |
| (6) <i>School of Mines Quarterly, Columbia Univ., New York City, 50c.</i>           | (34) <i>Portefeuille Economiques des Machines, Paris, France.</i>                                      |
| (7) <i>Gesundheits Ingenieur, München, Germany.</i>                                 | (35) <i>Nouvelles Annales de la Construction, Paris, France.</i>                                       |
| (8) <i>Stevens Institute Indicator, Hoboken, N. J., 50c.</i>                        | (36) <i>Cornell Civil Engineer, Ithaca, N. Y.</i>  |
| (9) <i>Industrial Management, New York City, 25c.</i>                               | (37) <i>Revue de Mécanique, Paris, France.</i>   |
| (11) <i>Engineering (London), W. H. Wiley, 432 Fourth Ave., New York City, 25c.</i> | (38) <i>Revue Générale des Chemins de Fer et des Tramways, Paris, France.</i>                          |
| (12) <i>The Engineer (London), International News Co., New York City, 35c.</i>      | (39) <i>Technisches Gemeindeblatt, Berlin, Germany, 0, 70m.</i>  |
| (13) <i>Engineering News, New York City, 15c.</i>                                   | (40) <i>Zentralblatt der Bauverwaltung, Berlin, Germany, 60 pfg.</i>                                   |
| (14) <i>Engineering Record, New York City, 15c.</i>                                 | (41) <i>Electrotechnische Zeitschrift, Berlin, Germany.</i>  |
| (15) <i>Railway Age Gazette, New York City, 15c.</i>                                | (42) <i>Proceedings, Am. Inst. Elec. Engrs., New York City, \$1.</i>                                   |
| (16) <i>Engineering and Mining Journal, New York City, 15c.</i>                     | (43) <i>Annales des Ponts et Chaussées, Paris, France.</i>   |
| (17) <i>Electric Railway Journal, New York City, 10c.</i>                           | (44) <i>Journal, Military Service Institution, Governors Island, New York Harbor, 50c.</i>             |
| (18) <i>Railway Review, Chicago, Ill., 15c.</i>                                     | (45) <i>Coal Age, New York City, 10c.</i>  |
| (19) <i>Scientific American Supplement, New York City, 10c.</i>                     | (46) <i>Scientific American, New York City, 15c.</i>   |
| (20) <i>Iron Age, New York City, 20c.</i>   | (47) <i>Mechanical Engineer, Manchester, England, 3d.</i>  |
| (21) <i>Railway Engineer, London, England, 1s. 2d.</i>                              | (48) <i>Zeitschrift, Verein Deutscher Ingenieure, Berlin, Germany, 1, 60m.</i>                         |
| (22) <i>Iron and Coal Trades Review, London, England, 6d.</i>                       | (49) <i>Zeitschrift für Bauwesen, Berlin, Germany.</i>   |
| (23) <i>Railway Gazette, London, England, 6d.</i>                                   | (50) <i>Stahl und Eisen, Düsseldorf, Germany.</i>  |
| (24) <i>American Gas Engineering Journal, New York City, 10c.</i>                   | (51) <i>Deutsche Bauzeitung, Berlin, Germany.</i>  |
| (25) <i>Railway Mechanical Engineer, New York City, 20c.</i>                        | (52) <i>Rigaskie Industrie-Zeitung, Riga, Russia, 25 kop.</i>  |
| (26) <i>Electrical Review, London, England, 4d.</i>                                 | (53) <i>Zeitschrift, Oesterreichischer Ingenieur und Architekten Verein, Vienna, Austria, 70h.</i>     |
| (27) <i>Electrical World, New York City, 10c.</i>                                   | (54) <i>Transactions, Am. Soc. C. E., New York City, \$12.</i>   |
| (28) <i>Journal, New England Water-Works Assoc., Boston, Mass., \$1.</i>            | (55) <i>Transactions, Am. Soc. M. E., New York City, \$10.</i>   |
| (29) <i>Journal, Royal Society of Arts, London, England, 6d.</i>                    | (56) <i>Transactions, Am. Inst. Min. Engrs., New York City, \$6.</i>                                   |

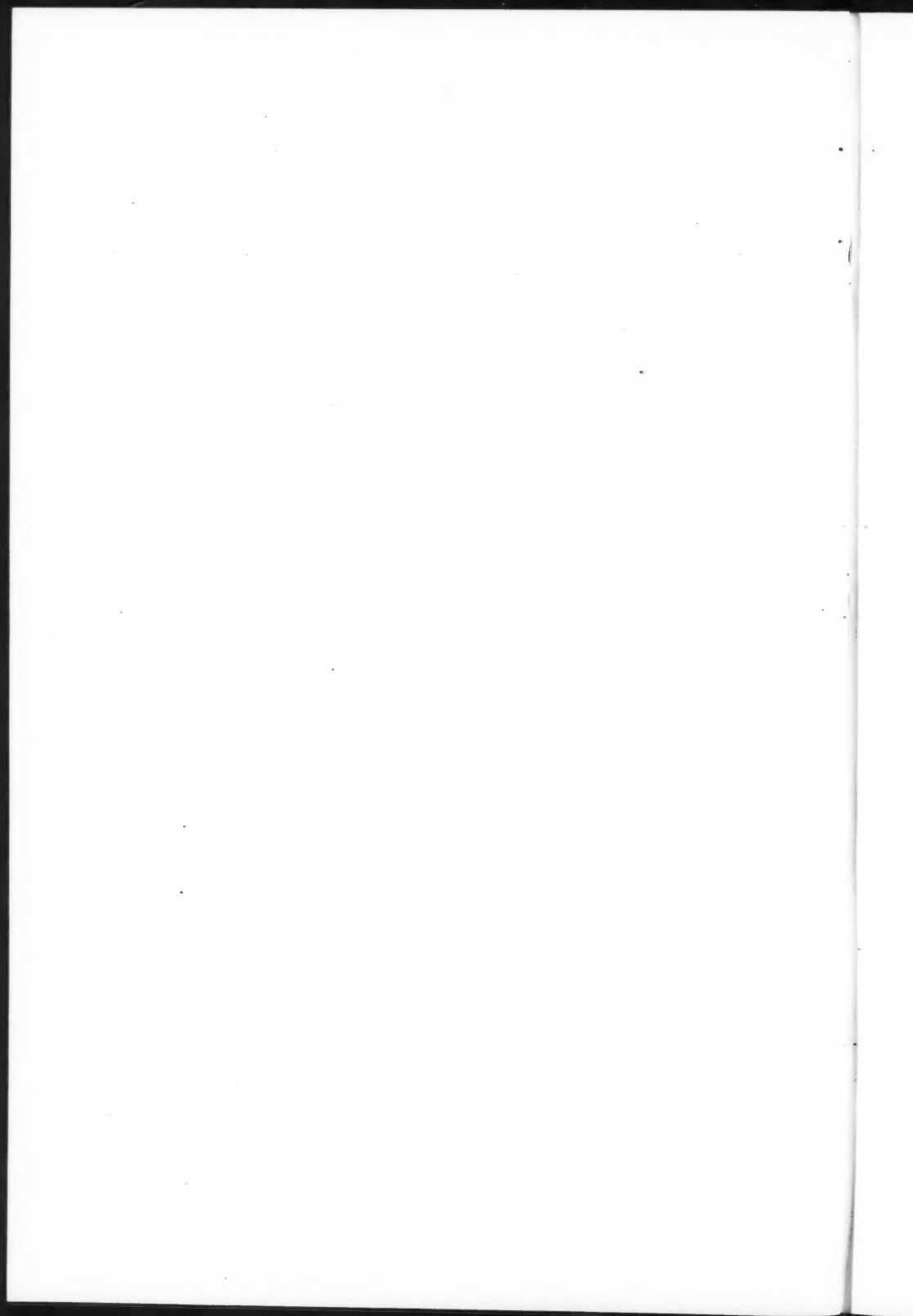
- (57) *Colliery Guardian*, London, England, 5d.  
 (58) *Proceedings*, Engrs.' Soc. W. Pa., 2511 Oliver Bldg., Pittsburgh, Pa., 50c.  
 (59) *Proceedings*, American Water-Works Assoc., Troy, N. Y.  
 (60) *Municipal Engineering*, Indianapolis, Ind., 25c.  
 (61) *Proceedings*, Western Railway Club, 225 Dearborn St., Chicago, Ill., 25c.  
 (62) *American Drop Forger*, Thaw Bldg., Pittsburgh, Pa., 10c.  
 (63) *Minutes of Proceedings*, Inst. C. E., London, England.  
 (64) *Power*, New York City, 5c.  
 (65) *Official Proceedings*, New York Railroad Club, Brooklyn, N. Y., 15c.  
 (66) *Journal of Gas Lighting*, London, England, 6d.  
 (67) *Cement and Engineering News*, Chicago, Ill., 25c.  
 (68) *Mining Journal*, London, England, 6d.  
 (69) *Der Eisenbau*, Leipzig, Germany.  
 (71) *Journal*, Iron and Steel Inst., London, England.  
 (71a) *Carnegie Scholarship Memoirs*, Iron and Steel Inst., London, England.  
 (72) *American Machinist*, New York City, 15c.  
 (73) *Electrician*, London, England, 18c.  
 (74) *Transactions*, Inst. of Min. and Metal., London, England.  
 (75) *Proceedings*, Inst. of Mech. Engrs., London, England.  
 (76) *Brick*, Chicago, Ill., 20c.  
 (77) *Journal*, Inst. Elec. Engrs., London, England, 5s.  
 (78) *Beton und Eisen*, Vienna, Austria, 1, 50m.  
 (79) *Forscherarbeiten*, Vienna, Austria.  
 (80) *Tonindustrie Zeitung*, Berlin, Germany.  
 (81) *Zeitschrift für Architektur und Ingenieurwesen*, Wiesbaden, Germany.  
 (82) *Mining and Engineering World*, Chicago, Ill., 10c.  
 (83) *Gas Age*, New York City, 15c.  
 (84) *Le Ciment*, Paris, France.  
 (85) *Proceedings*, Am. Ry. Eng. Assoc., Chicago, Ill.  
 (86) *Engineering-Contracting*, Chicago, Ill., 10c.  
 (87) *Railway Engineering and Maintenance of Way*, Chicago, Ill., 10c.  
 (88) *Bulletin of the International Ry. Congress Assoc.*, Brussels, Belgium.  
 (89) *Proceedings*, Am. Soc. for Testing Materials, Philadelphia, Pa., \$5.  
 (90) *Transactions*, Inst. of Naval Archts., London, England.  
 (91) *Transactions*, Soc. Naval Archts. and Marine Engrs., New York City.  
 (92) *Bulletin*, Soc. d'Encouragement pour l'Industrie Nationale, Paris, France.  
 (93) *Revue de Métallurgie*, Paris, France, 4 fr. 50.  
 (95) *International Marine Engineering*, New York City, 20c.  
 (96) *Canadian Engineer*, Toronto, Ont., Canada, 10c.  
 (98) *Journal*, Engrs. Soc. Pa., Harrisburg, Pa., 30c.  
 (99) *Proceedings*, Am. Soc. of Municipal Improvements, New York City, \$2.  
 (100) *Professional Memoirs*, Corps of Engrs., U. S. A., Washington, D. C., 50c.  
 (101) *Metal Worker*, New York City, 10c.  
 (102) *Organ für die Fortschritte des Eisenbahnwesens*, Wiesbaden, Germany.  
 (103) *Mining and Scientific Press*, San Francisco, Cal., 10c.  
 (104) *The Surveyor and Municipal and County Engineer*, London, England, 6d.  
 (105) *Metallurgical and Chemical Engineering*, New York City, 25c.  
 (106) *Transactions*, Inst. of Min. Engrs., London, England, 6s.  
 (107) *Schweizerische Bauzeitung*, Zürich, Switzerland.  
 (108) *Iron Tradesman*, Atlanta, Ga., 10c.  
 (109) *Journal*, Boston Soc. C. E., Boston, Mass., 50c.  
 (110) *Journal*, Am. Concrete Inst., Philadelphia, Pa., 50c.  
 (111) *Journal of Electricity, Power and Gas*, San Francisco, Cal., 25c.  
 (112) *Internationale Zeitschrift für Wasser-Versorgung*, Leipzig, Germany.  
 (113) *Proceedings*, Am. Wood Preservers' Assoc., Baltimore, Md.  
 (114) *Journal*, Institution of Municipal and County Engineers, London, England, 1s. 6d.  
 (115) *Journal*, Engrs.' Club of St. Louis, St. Louis, Mo., 35c.  
 (116) *Blast Furnace and Steel Plant*, Pittsburgh, Pa., 15c.

## LIST OF ARTICLES

## Bridges.

- Notes on the Clifton Suspension Bridge.\* L. S. McKenzie. (114) Jan.  
 Large Bridge Struts (Tests and Failures).\* (21) Jan.  
 Sciotoville Bridge Erection Is Well Started.\* (13) Jan. 4.  
 University Bridge, Saskatoon: Ten-Span Concrete Bridge, Summary of Costs, Specifications and Construction Methods.\* C. J. Yorath. (96) Jan. 4.  
 Harrisburg Bridge Centers Moved in Average Time of Six Hours.\* Frank P. Kernon. (14) Jan. 6.  
 Arch Design Adopted for Galveston Causeway Reconstruction.\* (14) Jan. 6.  
 Portable Timber-Framing Machine Used on Keokuk Bridge.\* (13) Jan. 11.

\* Illustrated.





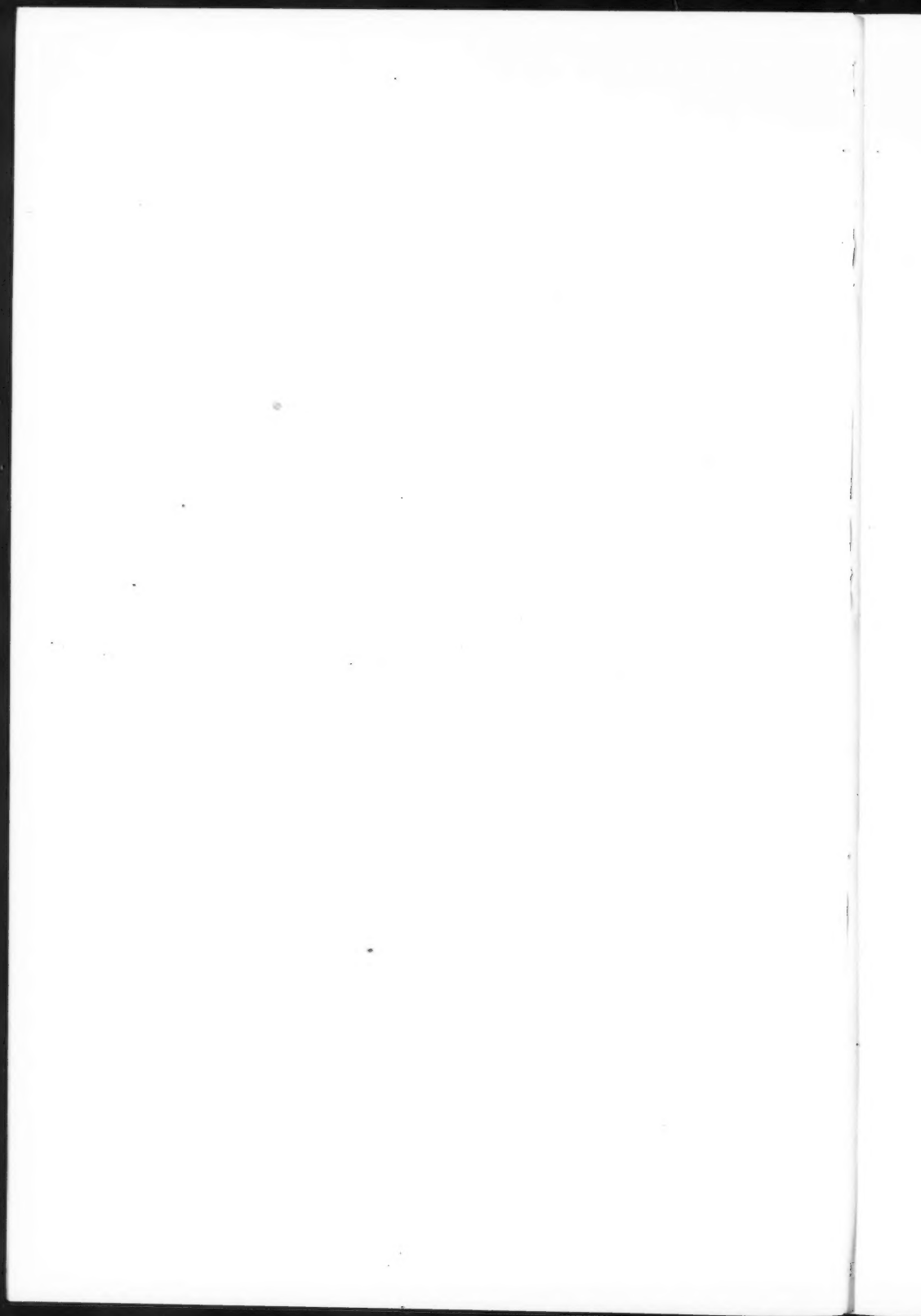
**Bridges—(Continued).**

- Cold Bituminous Mixtures for Plank Floors of Highway Bridges.\* B. H. Piepmeyer. (13) Jan. 11.  
 A New Bridge over the Mississippi River.\* (15) Jan. 12.  
 Concreting the Footings and Piers of a Viaduct 196 Ft. High. (13) Jan. 18.  
 Four Spans of Union Pacific's Omaha Bridge Rolled to Place. (13) Jan. 18;  
 (15) Jan. 19; (46) Jan. 13.  
 Three Washed-Out Steel Spans Replaced in Ten Days.\* (14) Jan. 20.  
 Lead-Lined Expansion Joints in Floor of Concrete Arch Bridge.\* (14) Jan. 20.  
 Straightening Bent I-Beams by Hanging over Fire.\* (86) Jan. 24.  
 The St. Charles Bridge Fire.\* (86) Jan. 24.  
 Method of Erecting Large Concrete Arch Bridge Without False Work. (86) Jan. 24.  
 Outside Template for Building Lackawanna Steel Sheet Pile Cofferdams. (86) Jan. 24.  
 Concrete Pile Trestle Bridge with Cellular Slabs. C. E. Nagel. (Abstract of paper read before Northwestern Road Congress.) (86) Jan. 24.  
 One-Span Concrete Arches on Sides Widen Two-Arch Stone Bridge.\* (13) Jan. 25.  
 Extending Cincinnati Approach to the Covington Bridge Over the Ohio.\* (13) Jan. 25.  
 Le Pont en Arc de Old T-Rails, sur le Colorado. (Californie, E.-U.)\* (33) Dec. 30, 1916.  
 Etude sur un Nouveau Système de Pont Suspendu Rigide à Arcs Doubles. G. Leinekugel le Cocq. (33) Serial beginning Jan. 6.

**Electrical.**

- Direct-Current Motors in the Steel Mill.\* H. F. Stratton. (Paper read before Am. Assoc. of Iron and Steel Electrical Engrs.) (47) Dec. 22, 1916.  
 Air Analysis of Electric Cooking. H. O. Swoboda. (Abstract of article from *Electrical Review and Western Electrician*.) (73) Dec. 22, 1916; (26) Jan. 12.  
 British Thomson-Houston Rotary Converters.\* (73) Serial beginning Dec. 22, 1916.  
 Electricity Supply. J. A. Robertson. (Abstract from the *British Westinghouse Club News*.) (26) Dec. 22, 1916.  
 Some Notes on the Theory of Iron-Cored High Frequency Current Transformers.\* N. W. McLachlan. (73) Dec. 22, 1916.  
 Some Characteristics of Crystal Detectors.\* Victor A. Hunt and Laurens E. Whittemore. (From *Physical Review*.) (73) Dec. 29, 1916.  
 A Universal Resistance Standardising Bridge.\* C. V. Drysdale. (73) Serial beginning Dec. 29, 1916.  
 Polyphase Alternating Current Commutator Motors with Shunt Characteristics.\* (12) Dec. 29, 1916; (26) Jan. 12.  
 Some Sources of Error in Thermometry.\* E. B. Pausey. (26) Dec. 29, 1916.  
 Controllers for Various Industrial Motors. H. D. James. (From *The Electric Journal*.) (62) Serial beginning Jan.  
 Regenerative Braking of Electric Vehicles.\* R. E. Hellmund. (42) Jan.  
 The Luminous Efficiency of the Radiation from the Electric Arc. Enoch Karrer. (3) Jan.  
 The Characteristics of Iron in High Frequency Magnetic Fields. Ralph Bown. (3) Jan.  
 Experiments on Porcelain Suspension Insulator Units.\* J. Cameron Clark. (42) Jan.  
 Ceramics in Relation to the Durability of Porcelain Suspension Insulators.\* Harris J. Ryan. (42) Jan.  
 Investigation of Suspension Insulator Deterioration. J. E. Woodbridge. (42) Jan.  
 "Present Worth" Methods As Applied to Telephone Engineering Studies.\* A. P. Godsho. (2) Jan.  
 The Traffic Department of a Telephone Company. A. L. Gracey. (2) Jan.  
 Alternating Current Motor Troubles. George A. Schneider. (111) Jan. 1.  
 Recent Electrochemical Developments.\* J. W. Beekman. (111) Jan. 1.  
 The Electrical Study Course.\* (64) Serial beginning Jan. 2.  
 The Installation of Motors.\* R. Thistlewhite. (64) Serial beginning Jan. 2.  
 Baking by Electricity. G. Basil Barham. (26) Jan. 5.  
 Electric Trucks and Tractors.\* (26) Jan. 5.  
 The Sale of Electric Service in Larger Quantities.\* Peter Junkersfeld. (27) Jan. 6.  
 The Future Opportunities for American Electrochemistry.\* E. F. Roeber. (27) Jan. 6.  
 The Outlook in Illumination at an Important Period of Development.\* Preston S. Millar. (27) Jan. 6.  
 Sensibility of the Eye to Varying Degrees of Light.\* (27) Jan. 6.  
 Commutation in Continuous-Current Machines.\* A. M. Bennett. (64) Jan. 9.  
 Building Telephone Conduits. (13) Jan. 11.

\* Illustrated.



**Electrical—(Continued).**

- Cable Junction Boxes.\* S. G. (26) Serial beginning Jan. 12.  
 Design of Overhead Power Transmission Lines.\* A. F. W. Richards. (Paper read before Assoc. of Mining Electrical Engrs.) (22) Jan. 12.  
 Joint Use of Central Station Service and an Isolated Plant.\* (27) Jan. 13.  
 Automatic Substations Permit Large Saving in Des Moines. (17) Jan. 13.  
 Factors that Determine Economical Life of Transformers.\* Theodore B. Morgan. (27) Jan. 13.  
 Electric Furnaces.\* E. A. Wilcox. (111) Jan. 15.  
 Reconnecting Induction Motors—Rotating Magnetic Field.\* A. M. Dudley. (64) Serial beginning Jan. 16.  
 Safety-First Switchboard.\* (64) Jan. 16.  
 Heating Domestic Water Supply by Electricity. (101) Jan. 19.  
 Volcanic Heat Drives Electric-Power Plant in Italy. (14) Jan. 20.  
 The Heaviest Submarine Telephone Cable.\* (46) Jan. 20.  
 Features of New Jersey Company's Latest Station (Essex Station of Public Service Electric Company).\* P. H. Chase. (27) Serial beginning Jan. 20.  
 Fundamental Principles of Present-Day Transformer Design.\* W. M. McConahey and J. F. Peters. (27) Jan. 20.  
 A Rotary Interrupter for Large Induction Coils.\* Louis B. Laruncet. (19) Jan. 20.  
 A Peculiar Transformer Trouble. Leonard Kennedy. (64) Jan. 23.  
 Method of Erecting Radio Towers. A. C. Cunningham. (From *Public Works of the Navy*.) (86) Jan. 24.  
 The 210 000-Kw. Buffalo Steam Station.\* (27) Jan. 27.  
 Central Station Growth and Rate Reductions: Principles Underlying Method Adopted at Milwaukee and St. Louis. (27) Jan. 27.  
 A Central Station Viewpoint of an Isolated Power Plant. Julius G. Berger. (64) Jan. 30.  
 The Electrical Power Industry in China and Indo-China. Ludwig W. Schmidt. (64) Jan. 30.  
 Bemerkungen zu den "Richtlinien für Hochspannungsapparate".\* Probst. (41) Dec. 21, 1916.  
 Das neue Elektrizitätswerk der Stadt Chur an der Plessur bei Lilen.\* L. Kürsteiner. (107) Serial beginning Jan. 6.  
 Quecksilberdampf-Gleichrichter, Bauart Brown, Boveri & Cie.\* (107) Serial beginning Jan. 13.

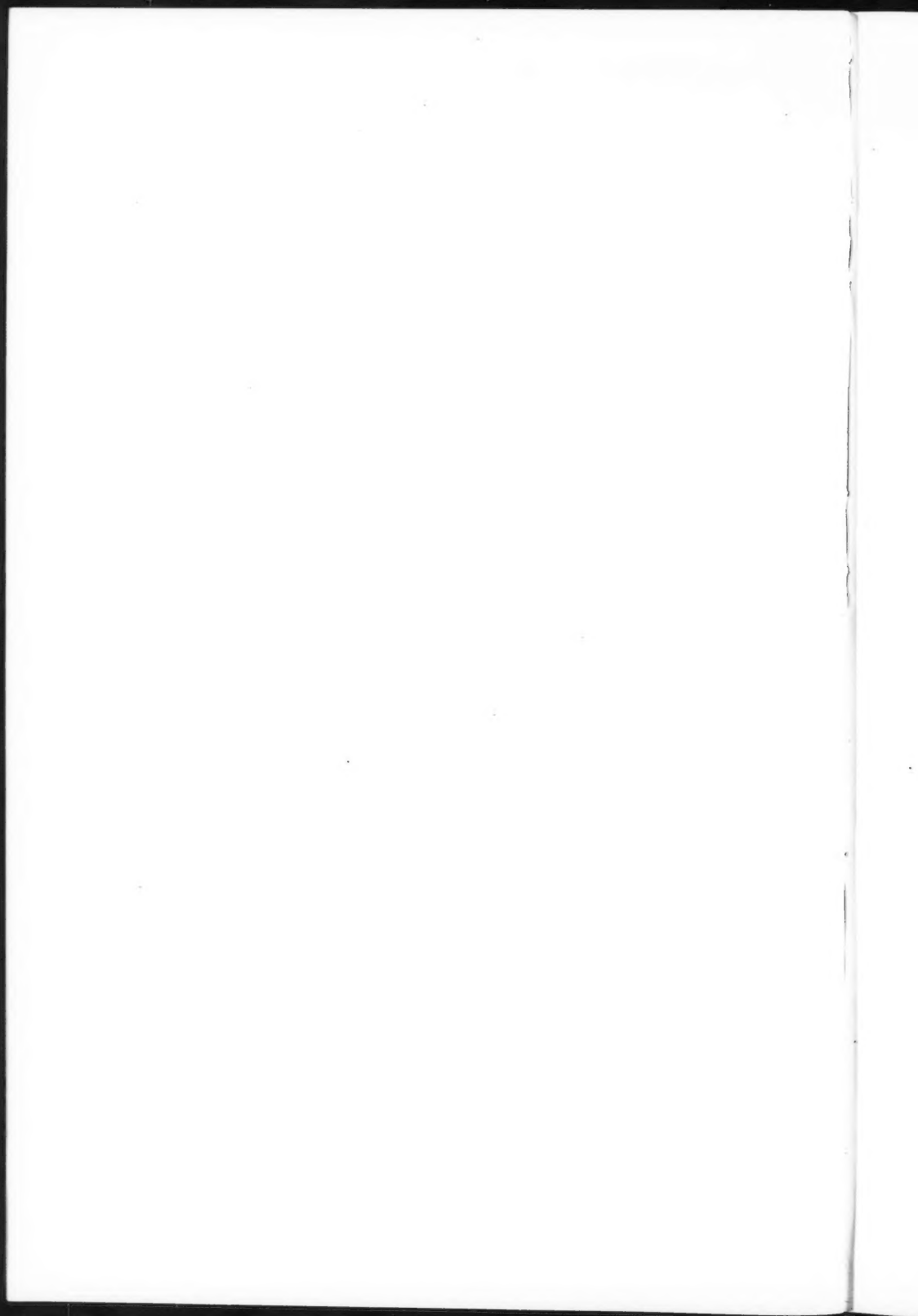
**Marine.**

- Trial of a 600-B. H. P., Two-Stroke, Direct Reversible Nobel Diesel Engine.\* Baron G. Steinheil. (11) Dec. 22, 1916.  
 Design of Submarines. W. L. Rodgers. (Paper read before Am. Soc. of Naval Architects and Marine Engrs.) (47) Dec. 22, 1916.  
 Reinforced Concrete Floating Structures. (12) Dec. 29, 1916.  
 A New Status of American Shipbuilding. W. L. Crounse. (20) Jan. 4.  
 The Advance in American Shipbuilding: Plant and Methods Brought to a High Standard—Labor Situation Not in Line with Improvement in Other Respects.\* (20) Jan. 4.  
 Recent American Warships. (12) Serial beginning Jan. 5.  
 Advantages and Future of Electric Ship Propulsion.\* W. L. R. Emmet. (27) Jan. 6.  
 The Power-Forging of Chain Cables. Frederick G. Coburn. (Paper read before Am. Soc. of Naval Architects and Marine Engrs.) (47) Jan. 12.  
 A Working Model of the *North Dakota*: Description of a Model of a Dreadnought 1-100th of Full Size.\* C. A. Myers, Jr. (46) Jan. 20.  
 Torpilleurs allemands et Destroyers anglais.\* (33) Jan. 6.

**Mechanical.**

- Vapors for Heat Engines. William D. Ennis. (8) Oct., 1916.  
 The Action of Solvents on Coal. (From *Journal of Soc. of Chemical Industry*.) (22) Dec. 15, 1916.  
 Oxy-Acetylene Welding. W. L. Brown. (Abstract of paper read before Assoc. of Mining Electrical Engrs.) (22) Dec. 15, 1916.  
 Modern Friction Surfaces.\* John Oswald. (Paper read before Assoc. of Mining Electrical Engrs.) (22) Dec. 15, 1916; (47) Jan. 19.  
 The Control of Gas Producers.\* A. C. Edmiston. (Paper read before Scottish Junior Gas Assoc.) (66) Dec. 19, 1916.  
 War-Time Lighting Economy and Restrictions. Leon Gaster. (Paper read before Illuminating Eng. Soc.) (66) Dec. 19, 1916; (104) Dec. 29, 1916; (73) Dec. 22, 1916.  
 Graphite Cylinder Lubrication. E. W. Johnston. (Abstract of paper read before the Birmingham Assoc. of Mech. Engrs.) (47) Dec. 22, 1916.  
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\* Illustrated.

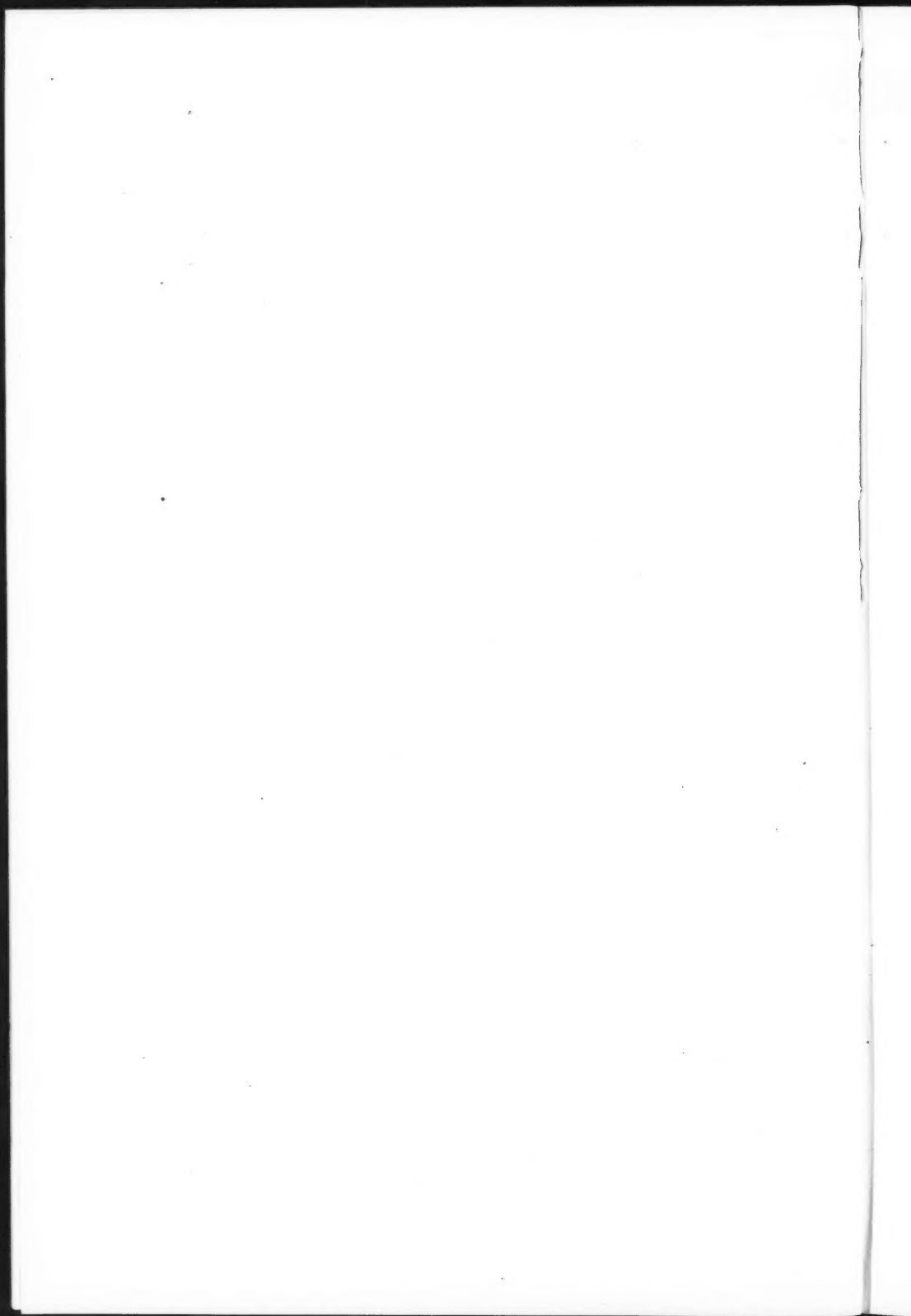


**Mechanical—(Continued).**

- Cast Iron: With Special Reference to Engine Cylinders.\* J. Edgar Hurst. (Paper read before Manchester Assoc. of Engrs.) (11) Serial beginning Jan. 12; (12) Dec. 22, 1916.
- Fuel Economy, with Special Reference to Briquetting.\* F. C. A. Lautsberry and J. Drummond Paton. (Paper read before Manchester Geological and Mining Soc.) (57) Dec. 22, 1916; (22) Dec. 22, 1916.
- A National Fuel and Power Policy. H. E. Armstrong. (Paper read before Soc. of Chemical Industry.) (57) Dec. 22, 1916; (66) Dec. 19, 1916.
- Recent Researches on the Constitution of Coal. R. V. Wheeler, D. T. Jones, and E. Teves. (From papers read before Chemical Soc. and Chemical Technical Inst. (66) Dec. 26, 1916.
- Hydrocarbons Contained in Coal. Aimé Pictet, L. Ramseyer and O. Kaiser. (Abstract of paper read before French Academy of Sciences.) (66) Dec. 26, 1916.
- Reorganization of a Paper Mill Power Plant.\* (12) Dec. 29, 1916.
- The Prache and Bouillon Evaporating Plants.\* (11) Dec. 29, 1916.
- A Method of Determining the Density of Flue Gases.\* James Alexander Smith. (Paper read before the Victorian Institute of Engrs.) (47) Dec. 29, 1916.
- Aluminum Castings and Forgings. F. E. McKinney. (Paper read before Am. Institute of Metals.) (47) Dec. 29, 1916.
- Liquid Measuring Pumps. F. J. Schlink. (From *Technologic Paper No. 81* of the United States Bureau of Standards.) (47) Dec. 29, 1916.
- Indicating Gear for Internal Combustion Engines.\* (12) Dec. 29, 1916.
- Rotary Shaping Machines for Aeroplane Propellers.\* (12) Dec. 29, 1916.
- Davey's Compound Condensing Pumping Engine.\* (47) Dec. 29, 1916.
- Some Notes on Hardening Screw Gauges.\* J. H. Lavender. (11) Dec. 29, 1916.
- Efficiency in Coke-Oven Practice. G. B. Foxwell. (Paper read before Sheffield University Gas and Coke-Oven Assoc.) (22) Dec. 29, 1916; (57) Jan. 12.
- Abrasive Paper and Cloth. F. B. Jacobs. (108) Jan.
- The Electric Welding Process. (From Report read before Assoc. of Railway Electrical Engrs.) (25) Jan.
- The Story of Abrasives. (108) Jan.
- Selecting Abrasives for Specific Uses.\* R. G. Williams. (9) Jan.
- Scientific Research for National Defense as Illustrated by the Problems of Aeronautics. (Abstract of paper read before National Academy of Sciences.) (3) Jan.
- Cement Products Factory. (67) Jan.
- Progress in Aeronautics. H. Bannerman Phillips. (From *United Service Magazine*.) (44) Jan.
- Comparison Basis for Auto Performance.\* Walter T. Fishleigh. (Paper read before Society of Automobile Engrs., Detroit Section.) (62) Jan.
- What is the Matter with the Belt Theory? W. F. Schaphorst. (108) Jan.
- The Plants of the Dolomite Products Company (Stone Quarrying).\* (67) Jan.
- By-Product Plant at Sheet & Tube Works (Youngstown, Ohio).\* Charles C. Lynde. (116) Jan.
- Measuring Gases by a Standard Orifice.\* Thomas G. Estep. (116) Jan.
- Power Equipment for Steam Plants: Part 5, Superheater.\* Robert L. Streeter. (9) Jan.
- A Shutter Testing Machine.\* Alfred B. Hitchins and F. B. Gilbert. (3) Jan.
- Highly Efficient Truck and Trailer Operation Rises to Emergency of Rush Work.\* (67) Jan.
- Efficiency To and From the Shop. Rollin W. Hutchinson, Jr. (9) Jan.
- Accurate Appraisal through Short Methods. (Machine Shops.) John G. Morse. (Extract of paper read before the Faraday Soc.) (62) Jan.
- The Modern Power Plant for Fuel Oil Consumption.\* Robert Sibley. (111) Jan. 1.
- Where Requirements Occur Intermittently, Gas for Heating Is an Economical Fuel. Rossiter S. Scott. (24) Jan. 1.
- Points Out Advantages to be Derived in Regulating Operations of Water Gas Sets by Measuring Flow of Gases at Superheater Outlet. J. M. Spitzglass. (Paper read before Am. Gas Institute.) (24) Jan. 1.
- Influence of Gas Standards on the Prosperity of the Industry. W. R. Addicks. (Paper read before the Illuminating Eng. Soc.) (83) Jan. 1.
- Continuous Meter Reading Plan Eliminates Peaks in Rochester Company's Book-keeping Department. F. H. Patterson. (Paper read before Am. Gas Institute.) (24) Jan. 1.
- Would Relieve Commercial Consumer of Necessity of Paying Directly for Lighting Units. J. P. Conroy. (24) Jan. 1.
- Low Temperature Compression System. Harry Sloan. (Paper read before Am. Soc. of Refrigeration Engrs.) (64) Jan. 2.
- The Gasoline Situation. Vannoy H. Manning. (Abstract of paper read before Washington Retail Merchants' Assoc.) (64) Jan. 2.
- Oil Coolers for Steam Turbines. A. G. Christie. (64) Jan. 2.

\* Illustrated.

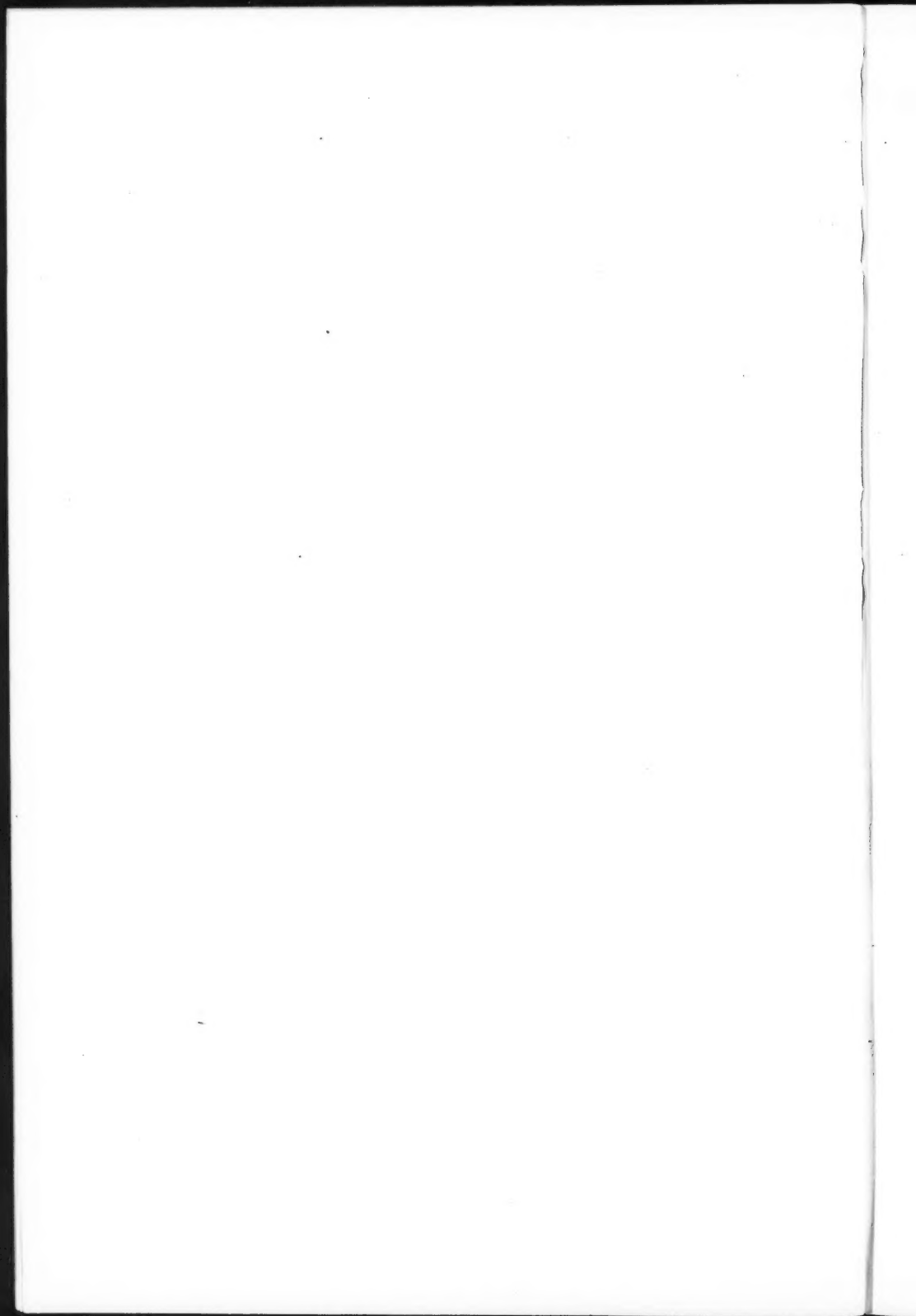




**Mechanical—(Continued).**

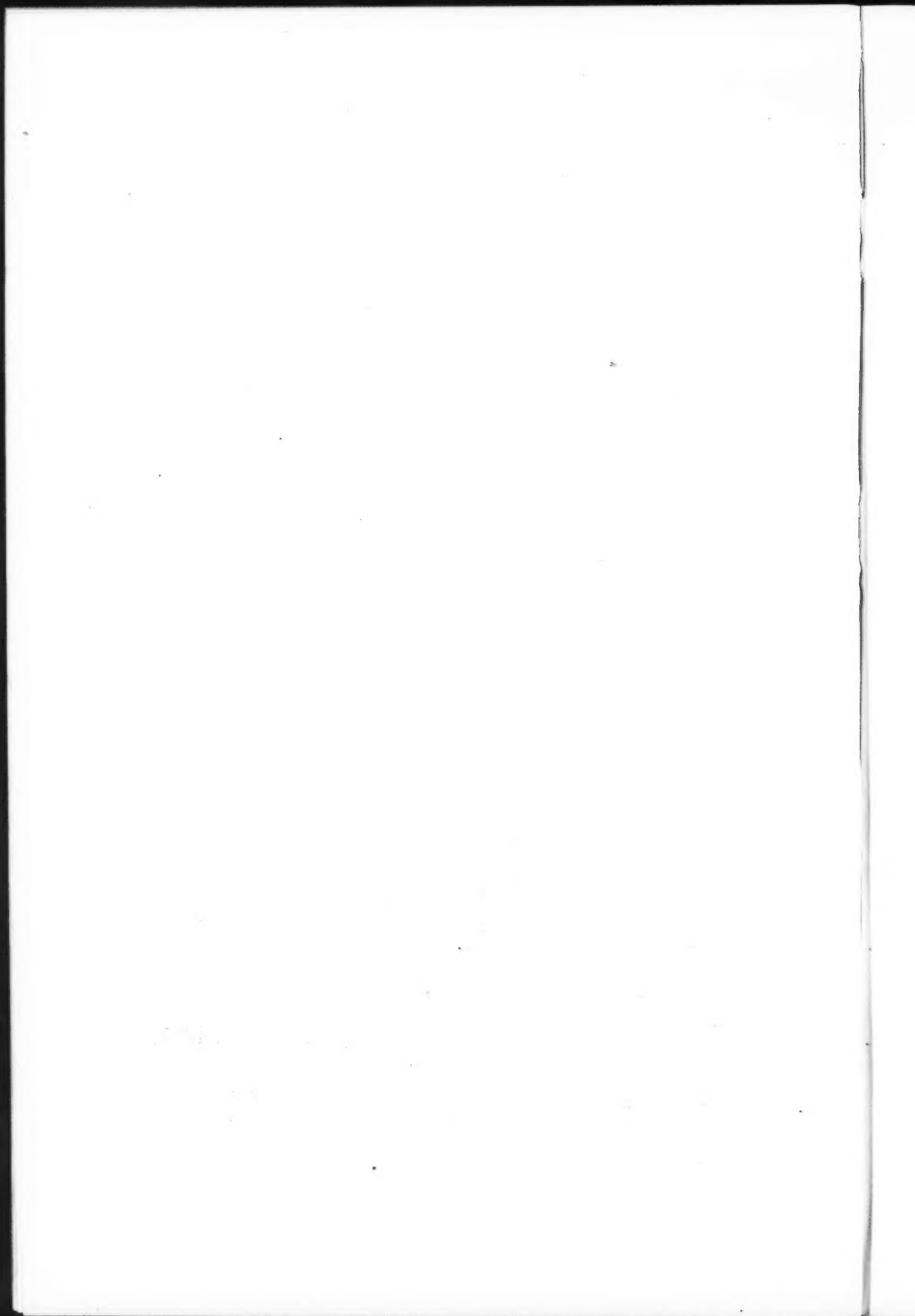
- Steam Engine Troubles.\* H. Hamkens. (64) Serial beginning Jan. 2.
- Production and Cost System for the Foundry: Obtaining the Costs of Individual Lots of Castings in the New Jobbing Plant of the Parsons Foundry Company.\* (20) Jan. 4.
- Nash Motors Company Foundry at Kenosha.\* Oliver J. Abell. (20) Jan. 4.
- Increasing Use of Secondary Machine Tools.\* C. A. Tupper. (20) Jan. 4.
- Waste Heat Boilers Make Good Record: Experimental Battery of Fire-Tube Boilers at South Chicago to be Augmented by Large Installation—Description of the Boiler.\* (20) Jan. 4.
- Tractive Resistance Tests with an Electric Motor Truck.\* (From Report to Research Division of Electrical Engineering Department of Massachusetts Institute of Technology.) (96) Jan. 4.
- Code for Testing House Heating Boilers. (From Report of Committee to Am. Soc. of Heating and Ventilating Engrs.) (101) Jan. 5.
- Belt Conveyor Coal Loading Plant in New South Wales.\* E. M. de Burgh. (Paper read before Northern Eng. Institute of New South Wales.) (12) Jan. 5.
- New Blowing Plant at Millom Works.\* (22) Jan. 5.
- The Manufacture of Manganese Steel Castings. W. S. McKee. (Abstract of paper read before Am. Foundrymen's Assoc.) (22) Jan. 5.
- Gas-Fired Kilns at Glenboig Works.\* (22) Jan. 5.
- High-Pressure Steam Stop Valves.\* D. MacNicol. (Paper read before Institute of Marine Engrs.) (11) Jan. 5.
- Ancestors of the Automobile: Development of the Present Day Car from the Earliest Types, as Revealed in the Files of the *Scientific American*.\* (46) Jan. 6.
- Attacking the Motor's Mightiest Enemy: Methods of Preventing and Removing Carbon Accumulations.\* John S. Harwhite. (46) Jan. 6.
- Trend of 1917 Passenger Car Design.\* (46) Jan. 6.
- Pulverized Coal as a Power-House Fuel.\* Reginald Trauttschold. (45) Jan. 6.
- The Elusive Measuring Pump: How the Purchasers of Gasoline May be Protected Against Intentional and Unintentional Fraud.\* Herbert W. Hoffman. (46) Jan. 6.
- Progress and Outlook in Prime Movers.\* W. F. Durand. (27) Jan. 6.
- The Motor Trucks of 1917.\* Victor W. Page. (46) Jan. 6.
- What Motor Trucks Offer to Contractors.\* Arthur J. Slade. (14) Jan. 6.
- In Future Rochester Company's Gas will be all Coal Gas. Herman Russell. (24) Jan. 8.
- Results of Tests of Gas-Burning Systems in Oil Cracking Installation Show Need of Careful Study of Industrial Fuel Tasks.\* Henry L. Read. (24) Jan. 8.
- Steam Engineers' License Examination.\* H. F. Gauss. (64) Serial beginning Jan. 9.
- Hand-Firing Soft Coal.\* Charles H. Bromley. (64) Jan. 9.
- Design of Oil Ring Bearings. William Knight. (64) Jan. 9.
- Mono CO<sub>2</sub>, SO<sub>2</sub>, and O Recorders.\* (64) Jan. 9.
- Safety Devices for Elevators.\* Jacob Gentz, Jr. (64) Jan. 9.
- Pipe-Bending Machine.\* Charles Wilde. (Abstract of paper read before Am. Gas Institute.) (86) Jan. 10.
- Cost of Welding Joints of Gas Mains by Oxy-Acetylene Process. Chester Wilde. (Abstract of paper read before Am. Gas Institute.) (86) Jan. 10.
- Plants of New Merger at Buchanan, Michigan. (Clark Equipment Company, Making Drills, Axles and Electric Furnace Castings.)\* (20) Jan. 11.
- Adapting the Motor Truck to Its Work. Clarence B. Montgomery. (13) Jan. 11.
- Rates of Depreciation and Their Treatment (Machine Tools). Charles Plez. (20) Jan. 11.
- Solid Fuels. S. G. Martlew. (Abstract of paper read before Assoc. of Engrs.-in-Charge.) (47) Jan. 12.
- Making Thin Wall Ornamental Brass Castings. R. S. B. Wallace. (Paper read before Am. Institute of Metals.) (47) Jan. 12.
- How to Save Fuel in Heating a House. L. P. Breckenridge and S. B. Flagg. (101) Serial beginning Jan. 12.
- Internal Combustion Engine Tests. W. A. Tookey. (12) Jan. 12.
- Worm Gear and Worm Gear Mounting.\* F. W. Lanchester. (Paper read before Institution of Automobile Engrs.) (11) Serial beginning Jan. 12.
- The Universal Gravity Bucket Conveyor.\* George Frederick Zimmer. (11) Jan. 12.
- Engine Lubrication. W. H. Reay. (Abstract of paper read before Institute of Marine Engrs.) (22) Jan. 12; (47) Jan. 19.
- Use of Peat in Gas-Producing Plants. E. C. C. Baly. (Abstract of paper read before Soc. of Chemical Industry.) (22) Jan. 12.
- The Condensation Pump.\* Irving Langmuir. (From *General Electric Review*.) (26) Jan. 12.
- Notes on an Old Colliery Pumping Engine (1791). W. T. Anderson. (Abstract of paper read before Manchester Geological and Mining Soc.) (22) Jan. 12.

\* Illustrated.



**Mechanical—(Continued).**

- Changes in Boiler Piping That Improved Steam Heating Service.\* (27) Jan. 13.  
 Oxide Purification—For and Against the Calorific Standard—Oxide Experiences of Gas Managers—Size of Purifiers. W. C. Jones. (Paper read before Midland Assoc. of Gas Managers.) (24) Jan. 13.  
 Home-Made Pipe Burners of Blast Type Used for Singeing Cloth at Concord, N. C. John S. Palmer. (24) Jan. 13.  
 Tests Demonstrate Adaptability of Gas to Melting of Soft Metals.\* Henry L. Read. (24) Jan. 13.  
 Simplified Use of the Calorimeter.\* (83) Jan. 15.  
 Fundamental Laws Involved in Fuel Oil Practice.\* Robert Sibley. (111) Jan. 15.  
 Data on the Methods and Cost of Running Gas Services. D. E. Keppelmann. (Extract from paper read before Pacific Coast Gas Assoc.) (83) Jan. 15.  
 Efficiency Methods in Public Utilities. E. L. Hall. (Paper read before Pacific Coast Gas Assoc.) (83) Jan. 15.  
 Care of Water Tube Boilers. A. C. McHugh. (64) Jan. 16.  
 Condenser Efficiencies.\* John D. Morgan. (64) Jan. 16.  
 Percentage Distribution of Power Costs. J. D. Morgan. (64) Jan. 16.  
 Correct Pressures to use in Fan Testing.\* John L. Alden. (64) Jan. 16.  
 The Ford Engine Room.\* Thomas Wilson. (64) Jan. 16.  
 Factors Controlling Maximum Overall Dimensions of Motor Trucks. A. F. Masury. (Paper read before Am. Assoc. for Advancement of Science.) (86) Jan. 17.  
 Relocating Equipment in a Machine Shop. Frederic Schreiber. (20) Serial beginning Jan. 18.  
 Manufacture of Steel Castings. Ernest F. Lange. (Abstract of paper read before Manchester Assoc. of Engrs.) (47) Serial beginning Jan. 19.  
 Gas Piping for Various Types of Buildings.\* (101) Serial beginning Jan. 19.  
 Lubrication and Lubricating Oils. F. W. Mann. (Abstract of paper read before Am. Petroleum Soc.) (47) Jan. 19.  
 Thermo-Physics of Cast Iron. Richard Moldenke. (Abstract of paper read before New England Foundrymen's Assoc.) (47) Jan. 19.  
 Briquetting of Lignites and Coals. G. J. Mashek. (45) Jan. 20.  
 Coal Trade in New York in 1916. (45) Jan. 20.  
 Carbon Residue from Oil-Gas Manufacture Used for Every Purpose for Which Coal is Utilized. E. L. Hall. (Abstract of paper read before Am. Gas Institute.) (24) Jan. 20.  
 Grooved Trap in Which Foreign Matter Invariably Accumulates Eliminated in Improved Valve.\* D. E. Keppelmann. (24) Jan. 20; (83) Feb. 1.  
 Weighing Coal at Power Plants.\* Henry J. Edsall. (64) Jan. 23.  
 Boiler Furnace Temperatures. George C. Cook. (64) Jan. 23.  
 CO<sub>2</sub> Records and Their Value.\* Victor J. Azbe. (64) Jan. 23.  
 California Air Tank Orders. (Issued by Industrial Accident Commission of California.) (64) Jan. 23.  
 Friction of Bronze on Bronze (Results of Tests). (From *Reclamation Record*.) (86) Jan. 24; (14) Jan. 27.  
 Tests on Surfacing Condensing Plant.\* (96) Jan. 25.  
 Two Year's Growth of an Abrasive Industry: The Expansion of Grinding Wheel Plants. (20) Jan. 25.  
 Muscle Shoals, Tenn., as the Site for the Government Nitrate Plant. (13) Jan. 25.  
 Test of a Four-Inch Single-Stage Turbine Pump.\* J. A. Parkin. (96) Jan. 25.  
 Adapting Motor Trucks to Desert Work. Edwin H. Warner. (13) Jan. 25.  
 Recovery of Benzol from Coke-Oven Gas: Operating Details of the Process—Benzol after the War—Use as Motor Fuel—Loss in Calorific Value of Gas. F. W. Sperr, Jr. (Abstract of paper read before Am. Institute of Chemical Engrs.) (20) Jan. 25; (24) Jan. 20; (83) Feb. 1.  
 Opportunity for Drying by Evaporation. Fred. R. Still. (Paper read before Am. Soc. of Heating and Ventilating Engrs.) (101) Jan. 26.  
 A Storehouse of Sleeping Energy; The Unique Chemical Advantage Which Acetylene Possesses Over Other Fuels. J. M. Morehead. (Paper read before International Acetylene Assoc.) (46) Jan. 27.  
 Camden Benzol Plant Will Take Care of All Gas Drip from Southern New Jersey.\* (24) Jan. 27.  
 Latest Improvements for the Preparation of Bituminous Coal—A Discussion. H. Reisser. (45) Jan. 27.  
 Open Pit Steam-Shovel Costs. J. M. Anderson. (16) Jan. 27.  
 Artificial Drying an Almost Limitless Field for Use of Gas. Gilbert C. Shadwell. (Paper read before Am. Soc. of Heating and Ventilating Engrs.) (24) Jan. 27.  
 A New Condensation Hygrometer.\* A. Breton. (From *La Nature*.) (19) Jan. 27.  
 Adoption of New Rate Schedule Brings Many Advantages to Martinsburg Gas Company. Leon H. Ware. (24) Jan. 27.  
 Perpetual Motion Analyses\* (Three prize papers). Paul Hoffman, Otto M. Foernsler, Joseph E. Bissell. (64) Jan. 30.





**Mechanical—(Continued.)**

- Saving Fuel in a Large Industrial Boiler Plant.\* David Moffat Myers. (9) Feb.  
 Grinding Wheels and Grinding Machines.\* C. W. Blakeslee. (9) Feb.  
 How to Set Shop Standards.\* George H. Shepard. (9) Feb.  
 The Appraisal of Manufacturing Plants. Charles W. McKay. (9) Feb.  
 Scales and Weighing Methods in Industrial Establishments.\* Herbert T. Wade.  
 (9) Serial beginning Feb.  
 Effective Coke Loading Machine.\* LeRoy Allison. (83) Feb. 1.  
 Santa Barbara's New Gas Works\* (California). Joseph M. Berkley. (83) Feb. 1.  
 Erfahrungen im Bau und Betrieb hochbeanspruchter Dampfkessel.\* Friedrich  
 Münzinger. (48) Nov. 11, 1916.  
 Das Zusammenarbeiten von Arzt und Ingenieur in der Prüfstelle für Ersatzglieder.\*  
 G. Schlesinger. (48) Nov. 11, 1916.  
 Ueber Rohölfeuerungen in Hüttenwerken.\* L. Schweitzer. (50) Dec. 7, 1916.

**Metallurgical.**

- Modernising a Basic-Bessemer Plant.\* (22) Dec. 22, 1916.  
 Smelting New Zealand Iron Sand.\* (12) Dec. 29, 1916.  
 Fuels Available for Metallurgical Furnaces. (116) Jan.  
 Characteristic Edges of Pig Iron Samples.\* Wallace G. Imhoff. (116) Jan.  
 The Future of the Iron Blast Furnace.\* J. E. Johnson, Jr. (105) Jan. 1.  
 Current Efficiency in Copper Refining. Lawrence Addicks. (105) Jan. 1.  
 The Electrolytic Behavior of Tungsten. Walter E. Koerner. (Paper read before  
 Am. Electro-chemical Soc.) (105) Jan. 1.  
 Modern Works Buildings (Youngstown Sheet and Tube Company).\* (20) Jan. 4.  
 United Alloy Steel Corporation's Work.\* (20) Jan. 4.  
 Metals and Alloys in the Steel Industry.\* De Courcy Browne. (20) Jan. 4.  
 Flotation in 1916.\* (103) Jan. 6.  
 A New British Electric Steel Furnace.\* (20) Jan. 11.  
 Chromium and Chromiferous Iron Ores. (11) Jan. 12.  
 Analysis of Babbitt Metal; Alloys of Tin, Antimony, Lead and Copper. E. W.  
 Hagmaier. (105) Jan. 15.  
 Vaporization of Metallic Copper in Wirebar Furnaces.\* Allison Butts. (105)  
 Jan. 15.  
 An Investigation of the Brittleness Produced in Steel Springs by Electroplating.  
 M. De Kay Thompson and C. N. Richardson. (105) Jan. 15.  
 The Calculation of Lead Blast Furnace Charges for Students of Metallurgy. Boyd  
 Dudley, Jr. (105) Serial beginning Jan. 15.  
 Progress in Hot-Blast Stove Design.\* Arthur J. Boynton. (Paper read before Am.  
 Iron and Steel Institute.) (20) Jan. 18.  
 The Rochester Cyanide Mill.\* A. C. Daman. (16) Jan. 20.  
 Notes on the Metallurgy of Copper. David H. Browne. (From *Bulletin of Canadian  
 Mining Institute.*) (103) Jan. 27.  
 A New Method of Zinc Precipitation.\* H. R. Conklin. (16) Jan. 27.  
 Flotation of Stibnite Ores. Joseph Daniels and C. R. Corey. (16) Jan. 27.  
 Metallurgy of Cadmium—Raw Materials, Technique and Economics. Franz Juretzka.  
 (Translated from *Metal und Erz* by Oliver C. Ralston.) (105) Feb. 1.  
 A New Electric Zinc Smelting Process.\* (105) Feb. 1.  
 Volatility of Gold at High Temperature in Atmospheres of Air and Other Gases.  
 W. Mostowitsch and W. Pletneff. (Translated in abstract from *Journal of  
 Russian Metallurgical Soc.*) (105) Feb. 1.  
 Sur le Dosage du Carbone par la Méthode Eggertz.\* H. Le Chatelier et F. Bogitch.  
 (93) July, 1916.  
 Etudes Comparatives des Métallurgies Françaises et Etrangères. (92) Sept., 1916.

**Military.**

- Trinitrotoluene Poisoning. (From Report to Ministry of Munitions in the *Lancet.*)  
 (66) Dec. 26, 1916.  
 Landing Operations and the Value of Mobile Defense. Giovanni Marietti. (From  
*Revista Militare Italiana.*) (44) Jan.  
 Shell Manufacture from Cast Steel.\* Edwin F. Cone. (20) Jan. 4.  
 Armored Automobiles: A War Machine that has Undergone Many Changes.\* (19)  
 Jan. 6.  
 Machine Guns by the Thousands: How a Gigantic Industry was Conceived, Planned  
 and Realized in Less than a Year's Time.\* Austin C. Lescarboua. (46)  
 Jan. 13.  
 On the Mexican Border with the 22d Engineers: Drainage—Bridges—Water Sup-  
 ply—Mexican Labor.\* C. E. Bregenzer. (14) Serial beginning Jan. 13.  
 Government Report on Munition Making. (From Report of Special Board to Sec-  
 retary of War.) (20) Jan. 18.  
 The Question of the Steel for Rifle Barrels. C. B. Langstroth. (20) Jan. 18.

\* Illustrated.



**Mining.**

- Electrical Experience at Collieries.\* Chris. Jones. (Paper read before Joint Meeting of National Assoc. of Colliery Managers and Assoc. of Mining Electrical Engrs.) (22) Serial beginning Dec. 15, 1916.
- Goaf Packing at the Mohpani Mines.\* F. L. G. Simpson. (From *Transactions of Mining and Geological Institute of India*.) (57) Dec. 22, 1916.
- Mineral Requirements of Our Iron and Steel Industries. W. G. Fearnside. (Paper read before Soc. of Engrs.) (57) Dec. 22, 1916.
- Non-Ferrous Metal Resources of the Empire. C. Gilbert Cullis. (Abstract of paper read before Soc. of Engrs.) (57) Dec. 22, 1916.
- Approved Safety Lamps (Mining).\* (57) Dec. 22, 1916; (22) Dec. 22, 1916.
- Electric Safety Lamps in Mines. (Discussion by the National Assoc. of Colliery Managers, Yorkshire Branch.) (22) Dec. 22, 1916.
- The "Summerlee" Visual Indicator.\* D. M. Mowat. (57) Dec. 22, 1916.
- The "Kek" Mill for the Production of Stone Dust.\* (22) Dec. 22, 1916.
- Mechanical Coal Cutting. (57) Dec. 29, 1916.
- The Weathering of Coal. J. B. Porter. (From *Canadian Mining Journal*.) (57) Dec. 29, 1916.
- Gas Analysis in Mine Fires. George A. Burrell and Frank M. Seibert. (From *Coal Trade Bulletin*.) (57) Dec. 29, 1916.
- The Stresses in Cast Iron Tubing Segments.\* (57) Dec. 29, 1916.
- Saving Effected with New and Modern Rock Drills Over Obsolete (Buckeye Mines of Tonopah). Letson Ballet. (82) Dec. 30, 1916.
- The Nature and Origin of Petroleum and Asphalt. Clifford Richardson. (105) Jan. 1.
- The Production of Salt in Szechuen Province, Western China.\* H. K. Richardson. (105) Jan. 1.
- The Iron-Ore Reserves of the World. H. H. Campbell. (20) Jan. 4.
- Roosevelt Drainage Tunnel of the Cripple Creek District.\* (13) Jan. 4.
- Coal and Its Economic Utilization. (Howard Lectures.) John S. S. Brame. (29) Serial beginning Jan. 5.
- Specific Gravity Studies in Coal. M. L. Nebel. (From University of Illinois *Bulletin No. 89*.) (22) Jan. 5.
- Coal-Cutting as Affected by Conditions.\* M. Gunnis. (Paper read before National Assoc. of Colliery Managers.) (22) Jan. 5.
- The Baillieston Pits of the Mount Vernon Colliery Company.\* (22) Jan. 5.
- New Fire Prevention Rules for Colliery Brigades. (22) Jan. 5.
- Protection of Mining Cables.\* Chris. Jones. (22) Jan. 5.
- The Movement of Mine Gas in Coal and Surrounding Rocks. M. N. Charnitzyn. (22) Jan. 5.
- Latest Improvements for the Preparation of Bituminous Coal.\* Warren Roberts. (Paper read before West Virginia Mining Institute.) (45) Jan. 6.
- Use of Permissible Explosives. (Extract of discussion before Mine Inspectors' Institute.) (45) Jan. 6.
- The Iron Pyrite Found in Coal.\* C. M. Young. (45) Jan. 6.
- Blackdamp in Mines. G. A. Burrell, I. W. Robertson and G. G. Oberfell. (From United States Mines Bureau *Bulletin No. 105*.) (57) Jan. 12.
- Market and Shipping Conditions on Atlantic Coast in 1916 (Coal). G. G. Wolkins. (45) Jan. 13.
- The Anthracite Industry in 1916. (45) Jan. 13.
- Business Aspects of the Coal Industry in 1916. A. T. Shurlick. (45) Jan. 13.
- Idaho Placer Operations (Placer Mining).\* Julius Hornbein. (16) Jan. 13.
- Mining Increasing in Oregon. Henry W. Parks. (16) Jan. 13.
- Mining in Idaho in 1916. Robert N. Bell. (16) Jan. 13.
- Operating a Steel-Sharpening Shop (For Mines). J. E. O'Rourke. (13) Jan. 13.
- Coal Cutting in Western Kentucky Mines. H. M. Ernst. (Paper read before Kentucky Mining Institute.) (45) Jan. 20.
- Coal Trade in Baltimore, Hampton Roads, Detroit, Buffalo, Toledo, Cincinnati, Louisville, Birmingham: The Middle West, Milwaukee, Southwest. (45) Jan. 20.
- An Accounting System for Coal Mines. R. J. Maxwell. (From *Canadian Mining Institute Bulletin*.) (45) Serial beginning Jan. 20.
- Filling Survey Data at Mines.\* R. S. Schultz. (16) Serial beginning Jan. 20.
- Mining in Utah in 1916. Edward R. Zalinski. (16) Jan. 20.
- Mining in Colorado in 1916. George E. Collins. (16) Jan. 20.
- Alaska Treadwell-Mexican-United Report (Gold Mining). F. W. Bradley. (From Report of President.) (16) Jan. 20.
- Power Plant at the Brushy Mountain Coal Mine, Petros, Tenn. A. W. Evans. (45) Jan. 27.
- Sub-Aqueous Mining of Anthracite Coal. P. A. Roche. (46) Jan. 27.
- Line and Return Troubles in the Haulage Systems of Coal Mines. I. Rowland Brown. (Paper read before Kentucky Mining Institute.) (45) Jan. 27.
- Tipple and Mining Methods at Hysylvania Mine No. 22.\* Wilbur G. Burroughs. (45) Jan. 27.

\* Illustrated.



**Miscellaneous.**

- The Engineer and Public Service. Clarence T. Johnston. (4) Nov., 1916.  
 The Estimation of Carbolic Acid in Crude Coal—Tar Phenols.\* René Masse. (Paper read before the Paris Academy of Sciences.) (66) Dec. 19, 1916.  
 Literature and Science in Education. A. C. Benson. (29) Dec. 22, 1916.  
 Industrial Engineering: Present Position and Post-War Outlook. F. W. Lancaster. (Abstract of paper read before Junior Assoc. of Engrs.) (73) Dec. 22, 1916.  
 The Rowan Premium System. (12) Dec. 22, 1916.  
 Scientific Research at the Universities. (12) Dec. 22, 1916.  
 A Decimal Money System. G. O. Parsons. (73) Dec. 29, 1916.  
 Some Aspects of Recent High Pressure Investigation (Chemistry).\* John Johnston. (3) Jan.  
 Education in Engineering (Presidential Address, 1916). D. S. Jacobus. (55) Jan.  
 The Duty of the Engineer to His Client and Himself. Stewart A. Jellett. (2) Jan.  
 Adapting Conditions and Work to Each Other. George H. Shepard. (9) Jan.  
 Measuring the Workman's Physical Fitness for His Job.\* Magnus W. Alexander. (9) Jan.  
 A Bureau of Governmental Research. Bruce Cornwall. (111) Jan. 1.  
 Stability of Paraffin Hydrocarbons. Gustav Egloff and Robert J. Moore. (105) Jan. 1.  
 Unit Method Used in Operating Plant.\* F. L. Prentiss. (20) Jan. 4.  
 Analyzing Every-Day Cost Records. E. Stern. (101) Jan. 5.  
 The Claims of Labour in the Engineering Industry. J. R. Richmond. (Paper read before Glasgow University Eng. Soc.) (11) Jan. 5.  
 The Commercial Production of Hydrogen. (12) Jan. 5.  
 The Constructive Movement for Scientific Cost Accounting.\* Edward N. Hurley. (27) Jan. 6.  
 Material Prices Reflect Labor Conditions.\* Henry D. Hammond. (14) Jan. 6.  
 The Relation of Engineering Education to National Development.\* A. E. Kennelly. (27) Jan. 6.  
 Engineer's Relation to Foreign Expansion. Charles A. Stone. (14) Jan. 6.  
 Professional Unity Among Engineers. Gano Dunn. (14) Jan. 6.  
 Contractors Meet Labor Shortage with More Plant and Better Organization.\* Henry D. Hammond. (14) Jan. 6.  
 Problems in Rate Regulation Accentuated by Higher Operating Costs. Halford Erickson. (27) Jan. 6.  
 Welding Glass in Optical Contact.\* G. R. Parker and A. J. Dalladay. (Paper read before Faraday Soc.) (11) Jan. 12.  
 System of Payment in Factories: A Study of Their Needs. (From *London Times Engineering Supplement*.) (19) Jan. 13.  
 The Human Side of the Development of Chemical Industry. G. W. Thompson. (Paper read before Am. Institute of Chemical Engrs.) (105) Serial beginning Jan. 15.  
 The Rubber Situation. Andrew H. King. (105) Jan. 15.  
 How Can the Engineer Improve His Public Standing? F. W. Hanna. (13) Jan. 18.  
 Depreciation and Value of Public Utilities. Charles C. James. (15) Jan. 19.  
 Electrolytic Hydrogen and Oxygen Generation. L. V. Curran. (16) Jan. 20.  
 The Chemistry of Manganese. M. L. Hartmann. (Abstract from *Pahasapa Quarterly*.) (103) Jan. 20.  
 Value of a Training in the Humanities for Engineers. Nelson P. Lewis. (Paper read before Am. Assoc. for Advancement of Science.) (96) Jan. 25.  
 Profession Defined—Wage-Earning Engineers Not Yet Members. F. H. Newell. (Extract from paper read before Cleveland Engineering Soc.) (14) Jan. 27.  
 Trench Construction Now Governed by "Safety Orders". (From Report of California Industrial Accident Commission.) (14) Jan. 27.  
 Development in Chemical Engineering Equipment.\* H. D. Miles. (Paper read before Am. Institute of Chemical Engrs.) (105) Feb. 1.  
 L'Enseignement Technique Supérieur. Léon Guillet. (32) Oct., 1916.

**Municipal.**

- Brief Notes on the Public Works of Worthing.\* Frank Worthing. (114) Dec., 1916.  
 Municipal Light and Power Plant: Operating Costs at Miles City, Montana. G. C. Pruett. (60) Dec., 1916.  
 Housing and Town Planning after the War. Harrison Barrow. (Paper read before the Town Planning Institute.) (104) Dec. 29, 1916.  
 City Planning for Bridgeport, Conn. John Nolen and Frank B. Williams. (60) Jan.  
 Methods and Cost of Maintaining 30 Acres of Parks and Boulevards.\* H. R. Ferris. (86) Jan. 3.

\* Illustrated.





**Municipal.—(Continued).**

- Fundamental Considerations in the Making of Plats. Arthur H. Dimock. (From paper read before the League of Washington Municipalities.) (86) Jan. 3; (96) Jan. 11.  
 Concrete Curb of Park Ponds Uninjured After Ten Years.\* Howard Lathrop. (13) Jan. 4.  
 Urban Housing Emergency Schemes. (From Report of Committee to the Surveyors' Institution.) (22) Jan. 5.  
 Legal Obstacles to Street Widening and City Planning.\* Charles K. Mohler. (13) Jan. 25.  
 La Cité Reconstituée. G. Espitallier. (92) Sept., 1916.

**Railroads.**

- Construction of a Narrow Gauge Railway in the Republic of Panama.\* Aaron S. Zinn. (4) Nov., 1916.  
 Railway Safety.\* H. J. Bell. (61) Nov. 20, 1916.  
 Highway Crossing Accidents—Their Cause, and How They can be Reduced. John S. Rockwell. (Paper read before National Safety Council.) (23) Dec. 22, 1916.  
 Canvassing for Traffic in India. Jowala Prasad Sinha. (23) Dec. 22, 1916.  
 Heavy Swedish Tank Locomotive.\* (23) Dec. 22, 1916.  
 Power Signalling Installation at Flemington, New South Wales.\* (12) Dec. 22, 1916; (23) Dec. 22, 1916; (15) Jan. 12.  
 Stresses in Locomotive Crank Axles.\* (23) Dec. 29, 1916.  
 Fuel Instruction Car on the Northern Pacific Railway.\* (23) Dec. 29, 1916.  
 Battery-Operated Distant Signals, Great Western Railway. (23) Dec. 29, 1916.  
 Protective Devices at Highway Crossings, Southern Pacific Co. (18) Dec. 30, 1916.  
 Retardation (of Cars). John Younger. (2) Jan.  
 The Use of Compressed Air in Railroad Shops.\* (From paper read before Assoc. of Railway Electrical Engrs.) (25) Jan.; (47) Jan. 19.  
 Gasoline Locomotives in Contract Work.\* (60) Jan.  
 Details of 4-4-0 Passenger Engine; Philadelphia and Reading Railroad.\* (21) Jan.  
 Practical Tests of Freight Car Paint.\* G. S. Evans. (25) Jan.  
 Construction and Working of Railways in South West Africa During Military Operations and Since Surrender of German Forces.\* W. W. Hay. (Extract from Report of Railways and Harbours of Union of South Africa.) (21) Jan.  
 Influence of Cooling on Service of Rails.\* P. H. Dudley. (116) Jan.  
 Reclaiming Scrap Maintenance Materials: Six Discussions of this Important Problem; Statements of Some of the Results Actually Secured.\* (87) Jan.  
 Timber Protection on the Santa Fe: A Description of the Methods by Which the Tie Requirements of This Line have been Reduced 650 000 Per Year.\* (87) Jan.; (15) Jan. 5.  
 Recent Development in Railway Signalling.\* (111) Jan. 1.  
 Concrete Ties in Holland.\* (13) Jan. 4.  
 Dispatcher's Selective-Control Railway Signal System.\* John B. Harlow. (13) Jan. 4.  
 Suggestions for Improving the System of Station Accounts, with Special Reference to their Check in Audit Offices. A. P. Webb. (23) Jan. 5.  
 The Electrification of the Pennsylvania Railroad, Philadelphia to Paoli.\* (23) Serial beginning Jan. 5.  
 Fire Extinguishers on Passenger Cars. T. S. Potts. (From paper read before Railway Fire Prevention Assoc.) (15) Jan. 5.  
 A Standard Lamp (Canadian Pacific Railroad).\* (15) Jan. 5.  
 60-Ton Petrol-Electric Locomotive.\* (23) Jan. 5.  
 British Locomotive Design and Performance. (23) Serial beginning Jan. 5.  
 Railway Scrap or Salvage. E. J. McVeigh. (From paper read before Canadian Railway Club.) (15) Jan. 5.  
 Washing Locomotive Smoke.\* M. D. Franey. (Abstract of paper read before International Assoc. for Prevention of Smoke.) (23) Jan. 5.  
 Some of the Very Pressing Transportation Problems. Winthrop M. Daniels. (15) Jan. 5.  
 Settling for Destroyed Cars Under 1916 M. C. B. Rules. (18) Jan. 6.  
 The Mechanical Firing of Locomotives.\* W. S. Bartholomew. (Abstract of paper read before St. Louis Railway Club.) (18) Jan. 6.  
 Mikado Type Locomotives for the Great Northern Railway.\* (18) Jan. 6.  
 The Unit Steam Railway Motor Car.\* (18) Jan. 6.  
 The Rectangular Exhaust Nozzle.\* D. R. MacBain. (From paper read before Central Railway Club.) (18) Jan. 6.  
 Reclamation of Metal Scrap in a Large Industrial Plant (Western Electric Co., Chicago). J. M. Bateman. (From paper read before Am. Institute of Metals.) (18) Jan. 6.  
 Willamette Pacific Railroad; A New Line Through the Coast Range.\* W. P. Hardesty. (13) Jan. 11.

\* Illustrated.



**Railroads—(Continued).**

- The Ratho Disaster (Edinburgh and Glasgow Main Line of the North British Railway).<sup>\*</sup> (23) Jan. 12; (12) Jan. 12.
- Wigan Railway Accident (London and Northwestern R. R.).<sup>\*</sup> (23) Jan. 12; (12) Jan. 12.
- Revision of Billing at Large Terminal Points. A. P. Ottarson. (Paper read before Am. Assoc. of Freight Agents.) (15) Jan. 12.
- Italy's New and Better Railroad Organization.<sup>\*</sup> (15) Jan. 12.
- Analysis of Steam Train Resistance.<sup>\*</sup> H. A. Houston. (23) Jan. 12.
- Railway Coaches Equipped as Camp Buildings for Lumber Crew.<sup>\*</sup> (14) Jan. 13.
- Water Treatment on the Missouri Pacific Railway.<sup>\*</sup> (18) Jan. 13.
- Duplex Locomotives on the Southern Railway.<sup>\*</sup> (18) Jan. 13.
- Report on Safety Appliance Inspection.<sup>\*</sup> H. W. Belnap. (Extracts from Report of Division of Safety to Interstate Commerce Commission.) (18) Jan. 13.
- Automatic Train Control. H. W. Belnap. (From Annual Report of Division of Safety to Interstate Commerce Commission.) (18) Jan. 13.
- Timber Treating Plant of the Boston Elevated Railway.<sup>\*</sup> E. W. Bright. (18) Jan. 13.
- A Proposed Highway Tunnel Beneath the Hudson River.<sup>\*</sup> (46) Jan. 13.
- Steam Railroad Electrification. J. A. Shaw. (Abstract of paper read before Canadian Railway Club.) (86) Jan. 17.
- Driving a River Tunnel Through a Mixed Face of Earth and Rock.<sup>\*</sup> Clifford M. Holland. (From *Public Service Record*.) (86) Jan. 17; (18) Dec. 30, 1916.
- The First Steam Railroad Appraisal by the Illinois Public Utilities Commission. (From State Public Utilities Commission of Illinois *Bulletin*.) (86) Jan. 17.
- Car Inspection a Vital Factor in Operation. Hiram W. Belnap. (From paper read before Central Railway Club.) (15) Jan. 19.
- Reinforced Concrete Coaling Stations on the St. Louis-San Francisco Railway.<sup>\*</sup> (18) Jan. 20.
- Housing of Better-Class Railroad Gangs Needs More Attention.<sup>\*</sup> J. T. Bowser. (14) Jan. 20.
- The Railway Problem: The Unsatisfactory Situation To-day Largely Due to Common Misapprehensions with Respect to Railway Questions. Frederic A. Delano. (Paper read before Railway Business Assoc.) (18) Jan. 20.
- Huge Chicago Freight Station for Pennsylvania Lines.<sup>\*</sup> (13) Jan. 25.
- Car Derricks for Handling Rails, Pipe and Timbers.<sup>\*</sup> (13) Jan. 25.
- The Maintenance of Electric Locomotives: Methods used on the New Haven to Secure Maximum Service from Its Electrical Equipment.<sup>\*</sup> (15) Jan. 26.
- Virginian Triplex Type Pusher Locomotive.<sup>\*</sup> (15) Jan. 26; (18) Jan. 27.
- Louisville & Nashville Extends Absolute-Permissive Signaling.<sup>\*</sup> (15) Jan. 26.
- Kansas City Southern Protests Against Tentative Valuation. (15) Jan. 26.
- Reinforced Concrete Successful for Railroad Culverts.<sup>\*</sup> Joseph S. Lambie. (14) Jan. 27.
- Grouping of Ties for Treatment.<sup>\*</sup> Carlille P. Winslow. (Abstract of paper read before Am. Wood Preservers' Assoc.) (18) Jan. 27.
- Locomotive Weighing Scales.<sup>\*</sup> A. W. Thompson. (From *General Electric Review*.) (18) Jan. 27.
- Treated Wood for Ties and Paving. (From Report to Am. Wood Preservers' Assoc.) (17) Jan. 27.
- Energetische Koeffizienten der virtuellen Länge von Bahnen, insbesondere bei elektrischem Betrieb. W. Kummer. (107) Dec. 16, 1916.

**Railroads, Street.**

- How the Car Doors of the New York Municipal Railway are Operated.<sup>\*</sup> Herbert T. Wade. (46) Jan. 6.
- Soldered Bonds Reinstalled at Low Cost.<sup>\*</sup> W. H. Evans. (17) Jan. 6.
- A Combination Snowplow for City and Interurban Use.<sup>\*</sup> R. A. Wilson. (17) Jan. 6.
- Rail Fillers and Key Blocks Prolong Special Work Life in New York City.<sup>\*</sup> (17) Jan. 6.
- "Straight-Talk" Publicity (Illinois Traction System).<sup>\*</sup> E. E. Soules. (17) Jan. 6.
- Special Ideas in Publicity Work (Kansas City Railways Company).<sup>\*</sup> E. B. Atchley. (17) Jan. 6.
- Publicity Pays (Georgia Railway & Power Company).<sup>\*</sup> W. T. Waters. (17) Jan. 6.
- A Public Relations Department (Mahoning & Shenango Railway & Light Company).<sup>\*</sup> Frank Wert. (17) Jan. 6.
- Advertising the Twin City Lines.<sup>\*</sup> A. W. Warnock. (17) Jan. 6.
- The Technique of Publicity (For St. Railroads).<sup>\*</sup> Ivy L. Lee. (17) Jan. 6.
- Street Railway Advertising: When, How and Why (Milwaukee Electric Railway & Light Company).<sup>\*</sup> Frank Putnam. (17) Jan. 6.
- Unit Costs of Construction for Permanent Way. H. W. Hayes. (From Report to Massachusetts Public Service Commission.) (17) Jan. 13.

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<sup>\*</sup> Illustrated.

The first of these is the fact that the number of persons who have been employed in the various departments of the Government has increased steadily since 1914. This is due to the fact that the Government has been engaged in a large number of public works, and has therefore required a large number of men to carry out these works. The second fact is that the number of persons who have been employed in the various departments of the Government has increased steadily since 1914. This is due to the fact that the Government has been engaged in a large number of public works, and has therefore required a large number of men to carry out these works. The third fact is that the number of persons who have been employed in the various departments of the Government has increased steadily since 1914. This is due to the fact that the Government has been engaged in a large number of public works, and has therefore required a large number of men to carry out these works.

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**Railroads. Street—(Continued).**

- Build Concrete Slab Under Busy Railroad Station to Expedite Subway Construction: Long Island Railroad Underpins Flatbush Terminal Below Track Level by Constructing Heavy Slab in Sections.\* (14) Jan. 13.  
 Old Cars Remodeled at Portland, Maine.\* (17) Jan. 20.  
 Cost of Erecting Overhead Work.\* (17) Serial beginning Jan. 20.  
 Maintaining a Continuous Property Inventory. Harold Bates. (17) Jan. 20.  
 Locating Trolley Wires and Hangers.\* R. Fingado. (17) Jan. 20.  
 Economical Car Lighting (Washington-Virginia Railway).\* W. A. Armstrong, Jr. (17) Jan. 27.  
 Effect of Low Voltage on Railway Motors.\* G. M. Woods. (Paper read before Illinois Electric Railway Assoc.) (17) Jan. 27.  
 How Construction Materials Are Stored and Handled in San Francisco (United Railroads).\* B. P. Legare. (17) Jan. 27.  
 Handling Way Materials Economically (Kansas City Railways).\* A. E. Harvey. (17) Jan. 27.

**Roads and Pavements.**

- The Design of Stone Block Pavements. Charles Carroll Brown. (60) Dec., 1916.  
 The Highway Situation in Maine.\* Irwin W. Barbour. (36) Dec., 1916.  
 New Paving Scheme in Georgia.\* J. B. Ansley. (60) Dec., 1916.  
 Efficiency and Economy in Road Construction. W. H. Reed. (60) Dec., 1916.  
 Slipperiness Test Pavements. (From Report to State Highway Commission of Massachusetts.) (13) Dec. 21, 1916.  
 Traffic Census and Pavement Maintenance: A Study of Their Relations. Harry F. Harris. (60) Jan.  
 The Construction and Maintenance of Stone Block Pavements.\* R. Keith Compton. (60) Jan.  
 The Asphalt Industry.\* (From an interview with James L. Rake.) (2) Jan.  
 Labor Costs of Laying Curved Granite Curbs at Street Intersections.\* H. R. Ferris. (86) Jan. 3.  
 Porous Tile in Sub-Surface Drainage. W. F. Childs, Jr. (Abstract of paper in *Cornell Civil Engineer.*) (86) Jan. 3.  
 Gravel Road Construction in Iowa. (86) Jan. 3.  
 Gravel Road Construction and Maintenance in Wisconsin. J. T. Donaghey. (Abstract of paper read before Northwestern Road Congress.) (86) Jan. 3; (14) Jan. 20.  
 Road Building in Kane County, Illinois, with County Outfits.\* George N. Lamb. (86) Jan. 3.  
 Cost of Hauling and Spreading Gravel with Motor Trucks. (86) Jan. 3.  
 Experimental Oil-Limestone and Sand Asphalt Road Constructed at Ocala, Fla. (From *Professional Paper* issued by the U. S. Office of Public Roads.) (86) Jan. 3.  
 Federal Participation in Road Work. James T. Voshell. (Abstract of paper read before Northwestern Road Congress.) (86) Jan. 3.  
 Concentration of Traffic on Highways. Frederick A. Reimer. (Abstract of Report of County Engineer.) (86) Jan. 3.  
 Detailed Cost of Surfacing Highway with Caliche.\* (86) Jan. 3.  
 Steel Plate Surfaced Pavement.\* (86) Jan. 3.  
 Suggestions on Maintaining Concrete Roads and Streets. (From *Circular* issued by Portland Cement Assoc.) (86) Jan. 3.  
 Maintenance Costs of Concrete Roads in Illinois. (86) Jan. 3.  
 Paving Equipment for Cuba.\* (86) Jan. 3.  
 Bituminous Sand-Grout Pavement (Specifications). J. A. Brodie. (96) Jan. 4.  
 Hudson River Road Built on Mountain Side.\* Eugene Geduldiger. (13) Jan. 4.  
 Rebuilding with Permanent Surface Old Macadam Roadways. Charles A. Carruth. (13) Jan. 4.  
 Road Material Surveys.\* L. Reinecke. (From *Memoir 85* of the Department of Mines, Ottawa.) (96) Jan. 4.  
 Making a Success of Road Contracting. H. Eltinge Breed. (14) Jan. 6.  
 Success in Earth-Road Contracting. W. S. Keller. (14) Jan. 6.  
 The Motor Truck and the Road. Nelson P. Lewis. (14) Jan. 6.  
 Influence of Federal-Aid Road Law on Highway Development. A. B. Fletcher. (14) Jan. 6.  
 Rebuilding with Permanent Surface Old Macadam Roadways. Theron M. Ripley. (13) Jan. 11.  
 Some Advantages of Refined Coal Tar for Road Construction and Maintenance. Philip P. Sharples. (Abstract of paper read before Am. Assoc. of State Highway Officials.) (96) Jan. 11.  
 Oiled Road Through Mojave Desert Built for \$950 per Mile.\* J. S. Bright. (14) Jan. 13.  
 Portage Avenue Improvement, Edmonton: Description Covering Three Years' Work on a Western Thoroughfare—Construction Methods.\* C. C. Sutherland. (96) Jan. 18.  
 Road Construction at Camp Borden.\* R. T. Bell. (96) Jan. 18.  
 Paving Alley Returns in Chicago.\* (13) Jan. 18.

\* Illustrated.





**Roads and Pavements—(Continued).**

- Building an 8-In. Macadam Pavement with a Tar and Gravel Top.\* Henry Marshall Olmstead. (13) Jan. 25.  
 Causes of Cracks in Cement Concrete Pavements. A. T. Goldbeck. (Paper read before Am. Assoc. for Advancement of Science.) (96) Jan. 25.  
 Limitations of Field and Laboratory Work in Highway Engineering in Civil Engineering Curricula. C. S. Farnum. (Paper read before Am. Assoc. for Advancement of Science.) (96) Jan. 25.  
 Gives Instructions on Care of Earth Roads in Winter. Frank T. Sheets. (From *Illinois Highways*.) (14) Jan. 27.  
 Build Philippine Roads in Seven Years at Half Estimated Cost. (14) Jan. 27.  
 Resurface Water-Bound Macadam with Asphalt Macadam.\* (14) Jan. 27.  
 Prepares Maps to Help Road Contractors in Bidding (Cook County, Illinois, Highway Department).\* (14) Jan. 27.  
 Etude sur le Profil en Travers des Chaussées de Paris.\* Louis Girard. (43) July, 1916.

**Sanitation.**

- The Garbage Disposal. F. E. Young. (60) Dec., 1916.  
 Segmental Block Sewers.\* J. F. Springer. (60) Dec., 1916.  
 Pumping Station and Sewage Disposal Plant, Warren, R. I.\* (60) Dec., 1916.  
 Can Explosives be Made at Sewage Works? S. Rideal. (Paper read before Assoc. of Managers of Sewage Disposal Works.) (104) Dec. 22, 1916.  
 Description of Barton Hill Baths, Bristol.\* H. W. Harding. (114) Jan.  
 Catch-Basin Construction and Maintenance (Discussion).\* (109) Jan.  
 Notes on the Eastville Refuse Destructor, Bristol, Eng.\* A. H. Claypoole. (114) Jan.  
 Transporting a City's Garbage. Felix J. Koch. (108) Jan.  
 The Mill Creek Sewer: Tunnel Construction on the Great St. Louis Drain.\* E. J. Rossback. (60) Jan.  
 Dutch-Oven Garbage Incinerators, Mason City, Iowa. Robert F. Gayton. (13) Jan. 4.  
 Activated-Sludge Power Costs.\* Gustav J. Requardt. (13) Jan. 4.  
 Small Sewer Tunnel Makes Rapid Progress by Shield Work. (13) Jan. 4.  
 Japanese Public Bath House Arrangement.\* (101) Jan. 5.  
 Estimating Quantities in Plumbing Work.\* (101) Jan. 5.  
 A New Type of Trickling Filter.\* G. G. Nasmith. (From *Journal of Royal Sanitary Institute*.) (104) Jan. 5.  
 A Recirculation Trunk Line Furnace Plant.\* (101) Jan. 5.  
 How Steam Heating Requirements are Figured.\* (101) Jan. 5.  
 Sanitation in a Bridgeport Munitions Plant.\* (101) Jan. 5.  
 Activated-Sludge Process of Sewage Disposal Firmly Established. T. Chalkley Hatton. (14) Jan. 6.  
 The Municipality in Industrial Hygiene. Louis I. Harris. (From Annual Report of Division of Industrial Hygiene read before Am. Public Health Assoc.) (19) Jan. 6.  
 The Sterilization of Tannery Waste. D. D. Jackson and A. M. Buswell. (Abstract of paper read before Am. Assoc. for Advancement of Science.) (86) Jan. 10.  
 Sewage Flow Measurements, Austin, Texas. Julian Montgomery. (13) Jan. 11.  
 Evolution of Warm-Air Heating Systems: A Historical Review of the Development of Warm-Air Furnace Equipment in European Countries. Herman Vetter. (Abstract of paper from *Gesundheits-Ingenieur*.) (101) Jan. 12.  
 Prof. Whipple Reports on New York's Proposed Garbage-Reduction Works. George C. Whipple. (From Report to New York State Department of Health.) (14) Jan. 13.  
 Results Given for Field Tests of Reinforced-Concrete Pipe (Storm-Water Sewer Pipe at Winnetka, Ill.) J. T. Child. (14) Jan. 13.  
 Manufactured Gas for Heating Houses.\* F. R. Hutchinson. (83) Jan. 15.  
 Studies of Dredged Drainage Ditches Before and After Clearing.\* Charles E. Ramser. (13) Jan. 18.  
 Travis Tank and Sprinkling Sewage Filters, Paqueta Island, Rio de Janeiro.\* Charles J. Seiber. (13) Jan. 18.  
 Some Notes on Warm Air Furnace Heating. Jesse M. McHenry. (Paper read before Am. Soc. of Heating and Ventilating Engrs.) (101) Jan. 19.  
 Fuels and the Economics of House Heating.\* (101) Jan. 19.  
 Engineers Guide Sewage-Disposal Inspection Trip. (14) Jan. 20.  
 Harrisonburg Imhoff Tanks.\* William G. Myers. (13) Jan. 25.  
 Nitrogen from Sewage. S. Rideal. (Abstract of paper read before Assoc. of Managers of Sewage Disposal Works.) (96) Jan. 25.  
 Two Sewers Laid in One Trench (Ann Arbor, Mich).\* Manly Osgood (14) Jan. 27.  
 Cave Over Mine Complicates City's Sewerage Problem (Iron Mountain, Mich.). (14) Jan. 27.  
 Utilization of Lumber Mill Waste.\* R. L. Watts. (64) Jan. 30.

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**Sanitation—(Continued).**

- Mains Artificielles pour Amputés; Idéal à Réaliser au Point de Vue Chirurgical.\* (33) Dec. 30, 1916.  
 Das Zusammenarbeiten von Arzt und Ingenieur in der Prüfstelle für Ersatzglieder.\* G. Schlesinger. (48) Nov. 11, 1916.

**Structural.**

- Design of Steel and Reinforced Concrete Domes.\* C. S. Whitney. (Abstract from Master's Thesis, 1915.) (36) Dec. 1916.  
 The Pyrene Fire Extinguisher.\* (11) Dec. 29, 1916.  
 Pile Driving and the Supporting Power of Piles.\* Henry Adams. (Paper read before Concrete Institute.) (104) Dec. 29, 1916.  
 Density in Concrete. (67) Jan.  
 Concrete Surfaces.\* (67) Jan.  
 Concreting in Cold Weather. (67) Jan.  
 The Strength of Bolted Joints of Timber Work.\* (21) Jan.  
 Screens for Gravel Washing and Screening.\* Arthur F. Kretzer. (67) Jan.  
 Drag Line Plant Transformed into a Washery.\* (67) Jan.  
 Ottawa Stone and Sand Co. Erecting New Plant.\* (67) Jan.  
 Notes on Preservation of Wood—Some Microscopical Features.\* James Scott. (21) Jan.  
 Heating Concrete in the Drum with an Oil Burner.\* (86) Jan. 3.  
 Column Sections Quickly Found by Novel Diagram.\* H. G. Nevitt. (13) Jan. 4.  
 Placing Ornamental Concrete on Steel Frames.\* Harry L. Dlyn. (13) Jan. 4.  
 Recommended Specifications for Reinforced Concrete Design. (From Report to Portland Cement Assoc.) (96) Jan. 4.  
 Taking Care of the Water from Roofs.\* (101) Jan. 5.  
 Woolworth Building, New York.\* Frank W. Skinner. (11) Serial beginning Jan. 5.  
 Pouring Concrete in Zero Weather.\* O. P. Geyer. (46) Jan. 6.  
 No Rust in Galvanized Steel Tower at Iloilo After 12 Years.\* J. L. Harrison. (14) Jan. 6.  
 Built-Up Sections of Redwood Forms Used Repeatedly.\* (14) Jan. 6.  
 Adding Three Stories to Engineering Societies Building.\* (13) Jan. 11.  
 Quartz-Gravel Aggregate Main Cause of Fire Damage to Concrete Building. Ira H. Woolson. (From Report to National Board of Fire Underwriters.) (13) Jan. 11; (14) Jan. 20.  
 Concrete Piles Not Affected by Deep Foundations Sunk Alongside.\* (13) Jan. 11.  
 Lightning Rods as a Protection to Buildings. W. H. Day. (Extract from paper read before Ontario Agricultural College.) (101) Jan. 12.  
 Prevention of Vibration in an Apartment House.\* (64) Jan. 2.  
 Bolted Timber Joints.\* William Alexander. (Paper read before South African Institution of Engrs.) (47) Jan. 12.  
 Gravel Dipping: An Opportunity for Small Contractors.\* (86) Jan. 17.  
 Analysis of Chicago By-Law for Flat Slabs (Building Construction). William Worth Pearse. (96) Jan. 18.  
 Nonfireproof Institutional Buildings in New York City Made Safe Against Fire.\* (13) Jan. 18.  
 A Graphic Method of Determining Centre of Gravity and Moment of Inertia.\* H. B. Wrigley. (96) Jan. 18.  
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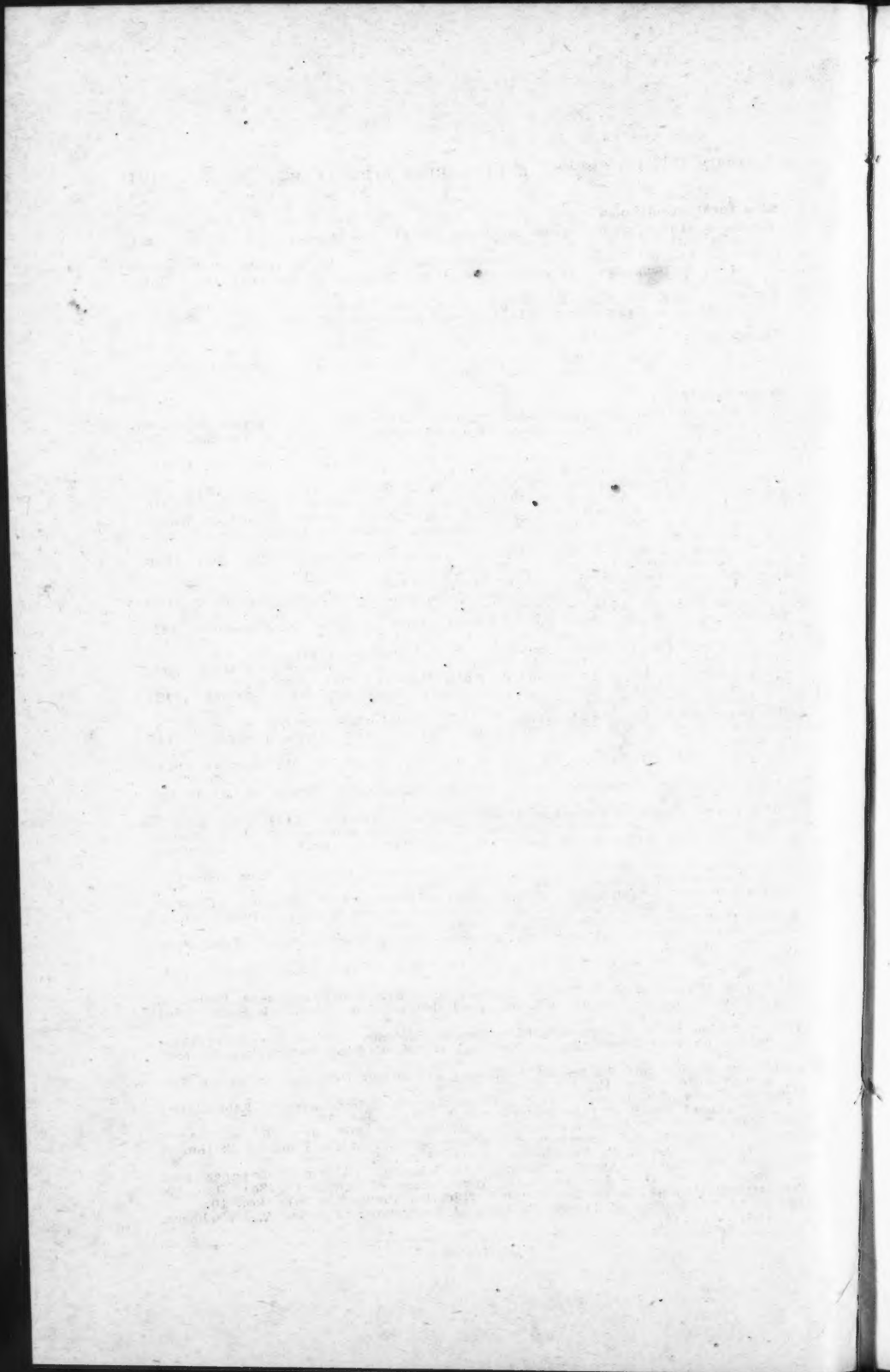
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\* Illustrated.





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\* Illustrated.